

COAL AGE

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One mine manager recently took exception to a statement we made that coal mines throughout the country were operating at "such and such" per cent. of their capacity. Because a local boom had struck his camp, he thought equally favorable conditions prevailed everywhere.

So it is with many people—they think only as far as they can see, and since each one's horizon is the limit of his vision, the conclusions arrived at by an individual are often wrong because they're based entirely on a local view. For this reason, it is necessary to consult figures rather than the man when we are wanting to know the nation-wide condition of an industry.

There's no denying that every other person we meet today is complaining of slack business—sort of a depression, etc. Yet, one thousand industrial companies in 1911 paid \$410,000,000 in dividends, which is \$30,000,000 more than was paid in 1910 and \$90,000,000 more than was paid in 1909. If that doesn't indicate a healthy growth, then we're justified in the belief that prosperity is indicated by reduced net income.

And how can we dispute that coal mining has received its fair proportion of the business advance of the age? In 1825 the United States produced 100,000 tons of coal; in 1850 it was seven million; in 1875 we mined 50 million; in 1900 the production was 270 million, and in 1911, the coal output of our country totaled approximately 500 million tons, or about 40% of the world's production.

If prices are low and general conditions unsatisfactory, let's not blame business, but more properly recognize that the trouble is within rather than without. An external application of salve on the stomach won't cure pimples on the nose; it's necessary to swallow something that will reach the spot, cure the indigestion and purify the blood.

We've heard for years that our summers are getting hotter and our winters milder, but the mercury makes a new low record for some particular day each

year; most every fortnight someone discovers that electricity will furnish all needed heat as well as power, but he forgets to tell us how he's going to generate electricity without burning coal; then we are disturbed by the fellow who has a scheme to pierce the depths of the earth and furnish us heat; still consumption increases, and it's safe to conclude our children's children will be using more coal in their homes and factories than we ever dreamed could be mined.

Therefore, viewing the industry in the light of fact, what is there to be discouraged about? 'Tis true wages have steadily increased and the cost of timber and other materials essential to mining has likewise advanced to new high prices, but similar conditions have prevailed at the same time in other great businesses, and still profits in the aggregate have grown each year. The rule of success today is, "For each added charge, there must be an added improvement," so if props cost 2c. more per ton of coal output, the cutting machines at the face, the haulage, the hoist, or something must be operated to effect an offsetting economy.

One operator recently showed me a cost sheet which read: Total mining, 0.4612; other costs, 0.0401; royalty, 0.05; handling, putting on cars, etc., 0.053; total cost per ton, 0.6043c., and it's needless to say he wasn't a pessimist on the situation. His philosophy was, that the chief advantage to be derived from the application of advanced methods and the adoption of improved machinery is not so much the immediate bettering of output and lowering of costs, as to place and keep your mine in position to profit in full when the periodic boom arrives.

Don't forget that in 1904 the wail of coal men was, "How can we remedy this overproduction?" in 1905 and 1906 the plaint had changed to, "Where can we get cars and men?" The pendulum is still swinging—a new year and likely a new era have dawned. People won't wear white diamonds on their bosoms till they've plenty of black ones in the cellar. Unless a man is ready for the chance, the opportunity will do him no good.

The World's Coal Production

A bluebook on colonial and foreign statistics, prepared by the British chief inspector of mines, and issued by the Home Office Department, supplies what are perhaps the most complete statistics in one volume, relating to persons employed, output and accidents at mines and quarries throughout the world. The volume was issued in September and gives the statistics for 1909, but owing to the want of adequate official data the figures in some cases have merely been estimated from the records of earlier years; those for the leading coal-mining nations are, however, fairly complete.

PRODUCTION

It is seen that at the mines and quarries of the world, 6,004,928 persons were employed, and of these the inspector shows that more than one-half were engaged in mining coal alone. Great Britain employed over 997,000; the United States, 660,000; Germany, 688,000; France, 190,000; Russia (1908), 174,000; Belgium, 143,000; Austria, 134,000, and India, over 119,000.

These are impressive figures, and we further learn that the coal produced was 1,113,308,386 metric tons, possessing a value estimated at nearly 400 million pounds sterling, or, say, two billion dollars. These figures show an increase in production for the year of 45 million tons but a decrease in value of 46 million dollars. The three leading coal-producing countries are the United States, with over 418 million tons; Great Britain, with over 268 million, and Germany, with over 217 million. These countries are followed by Austria-Hungary, France, Russia and Belgium, in the order given, representing the seven nations having a production of 20 million metric tons or more. Japan comes next on the list with 15,058,113 tons; India, with 12,060,550 tons; China, with 11 million tons, and Canada, with 9,526,784 tons.

MORTALITY STATISTICS

Taking the coal mines for which the figures are fairly complete, it is shown that the death rate per thousand persons employed in the United Kingdom was 1.43; the British Empire, 1.48; Austria, 1.13; Belgium, 0.95; France, 1.17; Japan, 3.51; Germany, 2.30, and for the United States, 3.35. The death rate for countries outside the British Empire generally was 2.48.

COMMONWEALTH OF AUSTRALIA

The Commonwealth produced 8½ million metric tons of coal in 1909, nearly 86 per cent. of which was furnished by New South Wales. In this state, excluding lignite and seams of the Triassic age, it is computed that the

Special Correspondence

A brief synopsis of the latest available statistics concerning the world's production, together with notes on the different fields. The total extraction is over one billion metric tons, having a value above two billion dollars. More than six million persons are employed.

*Abstract of report issued by the British Home Office Department.

main coal-bearing rocks extend over an area of 24,000 to 28,000 square miles around the seaport of Sydney.

As yet, Tasmania supplies less than 70,000 tons per annum, although there are abundant seams of marketable coal in the country. These belong to the Carboniferous and Mesozoic periods, and vary from 20 in. to 12 ft. in thickness, while brown coal and lignite occur all along the North Coast.

The state of Victoria contributed 130,230 tons. Since November, 1909, this state has owned its own coal mine on the Powlett River, the output of which to Sept. 7, 1910, was 93,431 tons, valued at the mine at \$203,883. At that date coal was being raised at the rate of over 1000 tons per day and over 900 men were employed in the mine and on the various development works.

The following figures show the main sources from which the fuel supply of the world for 1909 was obtained, with the value in pounds sterling and the increases or decreases on 1906:

MAIN SOURCES OF WORLD'S FUEL SUPPLY

Country	QUANTITY		VALUE	
	Metric Tons	Increase or Decrease on 1906	Dollars	Increase or Decrease on 1906
United States	448,038,000	+40,788,000	554,503,000	+22,571,000
Great Britain	268,007,000	+2,282,000	517,187,000	-50,241,000
Germany	217,446,000	+2,159,000	413,214,000	-1,119,000
Austria-Hungary	48,813,000	-153,000	74,314,000	+1,684,000
France	37,840,000	+456,000	112,110,000	-3,197,000
Russia	24,455,000	-1,448,000	(not stated)	
Belgium	23,518,000	-40,000	65,775,000	-8,307,000

CANADA

The oldest coal fields in Canada which have been largely developed, are situated on the seaboard of the Atlantic and Pacific Oceans. On the Atlantic side of the continent, bituminous coal is being mined from thick seams of true Carboniferous age at the Sydney (Cape Breton), Pictou, Inverness and Cumberland coal fields, in Nova Scotia. The coal of the Pacific Coast, generally bituminous,

belongs to the Cretaceous age, and is derived from collieries at Nanaimo, Extension, and Comox in Vancouver Island. The thick seams of bituminous coal, which exist in the vicinity of the Crow's Nest Pass, are now being worked on an extensive scale, and a large quantity of the coal mined is converted into coke for use in the smelting industry in British Columbia. All these coals are of Cretaceous age.

NATAL

In this colony in 1909 about 9000 persons were engaged, the coal produced being 1,815,253 metric tons, valued at \$3,229,400. There were 25 electrical coal-cutters and 97 worked by compressed air in operation, nearly 62 per cent. of the coal being obtained by machine-mining—perhaps the highest percentage for any single country in the world.

NEW ZEALAND

The output here was 1,941,918 tons, valued at \$5,055,000. The most important collieries are situated near Westport, on the West Coast of the Midland Island. More than one-third of the total output is brown coal or lignite, and many of the workings are open-cut. The coal from the West Coast bituminous fields is of a high class and used by the Admiralty. From the Point Elizabeth State coal mine, 207,450 tons were produced, and the amount from the Seddonville State mine was 74,180 tons during the year ended Mar. 31, 1910. The profits of both state mines during the fiscal year amounted to \$23,900.

AUSTRIA-HUNGARY

In Austria the principal workings for brown coal are in the Bruch-Dux-Teplitz

and Falkenau-Elbogener basins. In the former, seams of Miocene age occur up to a thickness of 98½ ft. (30 m.), while in the latter, seams of Miocene and Oligocene* age are worked. In the Schalltal district there is a seam which in places is over 100 m. (328 ft.) in thickness.

*The Oligocene is the transitional period between the Eocene and the Miocene of the Tertiary.—Editor.

Austria produced 13,713,042 metric tons of coal in 1909, nearly one-half of which was obtained from the Upper Silesian coal basin which is a continuation of the Prussian and Russian coal field. In this basin there are numerous rich seams of excellent coking coal.

BELGIUM

In this country, coal mining is the most important mineral industry, and there are six different regions; the most productive is the Charleroi district, yielding about one-third of the total output. The average production per underground worker in 1909 was only 228 metric tons, due probably to the small size of the seams, which on an average are only 2 ft. 1.59 in. (65 cm.) thick. In Belgium the average daily wage per underground worker is less than a dollar a day.

GERMAN EMPIRE

Deposits of brown coal are found in more or less abundance over nearly the whole of North Germany. The deposit

JAPAN

The coal-bearing formations of the Japanese Islands range from Mesozoic to Tertiary. The coal, which occurs in 43 of the 49 prefectures, is mainly bituminous and most of the seams belong to the Tertiary period. The principal coal fields may be divided into five groups as follows: Kyushu, Hokkaido, Honshu (the main island), the Southern Islands and Karafuts. More than two-thirds of the total output is produced in the island of Kyushu. In 1874 the output was less than a quarter of a million tons, and in 1909 it reached over 15 millions. A large part of the coal produced in Japan goes to supply the Chinese markets.

PERU

All the different varieties of fuel exist in Peru, viz., peat, lignite, coal and anthracite. Lignite is found in the Tertiary rocks on the coast and at the summit of the Cordillera at Cajamarca. The true coal and anthracite are found in the

RUSSIA

The most productive coal region of Russia is the Donets basin in the province of Ekaterinoslav, which covers an area of 16,000 square miles, the seams varying in thickness from 1 to 7 ft. The output of this basin in 1909 was 17,779,863 metric tons. Next in importance comes Poland, with an output of over 5½ million metric tons of true coal and brown coal. The Dombrowa Basin, in Poland, is a continuation of the great Silesian coal basin. Coal is abundant in Siberia, both east and west, and even along the line of the Trans-Siberian Ry., but the quality is poor. In the island of Saghalien, coal is worked by Russian convicts; the present output is small and is used by steamships.

SERVIA

Most of the coal in Serbia lies near the Danube, the workings of chief importance being at Dobra. The coal occurs in the Liassic formation, which belongs to the lower portion of the Jurassic.



IN MANY EUROPEAN MINES, GIRLS ARE EMPLOYED IN THE SCREEN HOUSES TO PUSH CARS AND PICK SLATE

of *Vorgebirge* near Cologne in the Rhine Province consists of a large, continuous bed extending about 25 km. (15½ miles) from north to south with an average width of 6 km. (5¾ miles). A preparation called *Kaumacit* has attracted some interest. It is brown coal rendered transportable and imperishable by a process of dry distillation, reducing the coal to from 35 to 50 per cent. *Kaumacit*. The process yields an additional 3 per cent. of tar, 17 to 26 lb. of ammonia, and 2500 cu.m. of gas, per load of 10 tons.

There are three principal coal-mining districts in Prussia: (1) The Lower Rhine and Westphalian Basin, by far the most important; (2) Silesia, and especially Upper Silesia; (3) the Rhenish district in the neighborhood of Saarbrücken and Aix-la-Chapelle. Most of the coal is derived from seams of the Carboniferous age; near Hanover there are extensive workings in the Wealden beds. In 1909 Germany exported 23,350,730 metric tons of coal.

Cretaceous rocks in various places, and a solid hydrocarbon which is neither coal nor anthracite occurs in veins, and is likewise worked and sold as mineral fuel. There are large areas of coal in the department of Ancachs, in the Santa Valley, at Jatunhuasi, near Jauja, in the department of Junin, in the neighborhood of Cerro de Pasco, and in the departments of Huanuco, Cajamarca and Libertad. The bulk of the output is obtained from the province of Cerro de Pasco.

PHILIPPINE ISLANDS

Coal occurs in the Tertiary shales and sandstones on nearly every island, with the greatest development in the Visayas. The most promising coal fields at present are situated in the provinces of Albay, Cebu, Tayabas, Sorsogon, Mindoro and Moro. Four coal seams have been found in Cebu having thicknesses of 2, 5, 10 and 13 ft. The total output in 1909 was obtained from two mines on the island of Batan in the province of Albay.

True coal, said to be almost as good as English coals, occurs and is worked in the Timok Valley, near Uruksa Tschuka. In the Boljevac district a coal basin extending over a large area has been discovered. Serbia is rich in mines of brown coal and thick beds of Tertiary brown coal occur at Senje, Sisevac, Resava, Jelasnica, Koaljevac and in many other parts of the country. The revenue from the state mine at Senje in 1909 was \$183,000 and the expenditure \$180,000. It is explained by the Mining Department that 60 per cent. of the total production from the state mines is delivered to the Servian State Ry., and charged at their own cost price; otherwise the working of the mines would result in a large profit.

SWEDEN

All the Swedish coal obtained in 1909 was produced from the provinces of Malmöhus and Kristianstad in the southern part of the kingdom. The seams, which are of Rhodanian age, are inter-

stratified with beds of fireclay, and the two minerals are worked together. The thickness of the coal seams, including the partings of shale, varies from 3 to 5 feet.

ITALY

In this country the development of the deposits of fossil fuel, which mineral is stated to be abundant in the provinces of Arezzo, Pisa and Grosseto in Tuscany, is hindered by the cheapness of imported coal from the United Kingdom. The total output in 1909 was only 555,073 metric tons, of which 552,136 tons were lignite, 2055 tons anthracite and 882 tons bituminous shale. Most of the lignite came from Tuscany; the anthracite from the provinces of Cagliari (Sardinia) and Turin, and the bituminous shale from Vicenza.

TURKEY

Although coal is known to occur in nearly all the provinces of the empire, the only mines deserving mention at the present time are those at Eregli. Important deposits of lignite or brown coal exist in the region of Lebanon, and near Lampsacus on the east side of the

Dardanelles. Coarse lignite has been found in several places near Sparta, Karaman, and in the Bulghar Dag which may prove useful for smelting purposes. Coal deposits are known to exist in the Van district in the province of Erzeroum.

SUMMARY

The tabulated statement in the next column shows the separate outputs, in 1909, of the various coal-producing countries of the world, as given in the report of the British Home Office. The figures for Brazil, China, Korea and Mexico are estimated from those of the previous year, and, in the case of Peru, Romania and Bulgaria, the totals given are for 1908.

It will be noted that the United States, with an output of 418 million tons in 1909, produced something over 37½ per cent. of the world's coal for that year, or 1½ times the amount mined by Great Britain and 1.9 times that produced by Germany, the two countries ranking second and third, respectively, in point of individual output. The annual production of coal in the United States has since increased by nearly 75 million tons.

WORLD'S PRODUCTION OF COAL

Country	Metric Tons
Great Britain and Ireland	268,007,257
Australia	8,316,452
British Borneo	127,944
Canada	9,516,784
Cape Colony	93,695
India	12,060,550
Natal (including Zululand)	1,815,253
New Zealand	1,941,918
Orange River	426,913
Rhodesia	155,032
Transvaal	3,287,328
Austria-Hungary	48,812,901
Bosnia and Herzegovina	696,114
Belgium	23,517,550
Brazil	15,000
Bulgaria	162,992
Chile	898,971
China	11,000,000
Ecuador	4
France	37,840,086
Indo-China	384,053
German Empire	217,445,656
Greece	3,873
Holland	1,120,852
Dutch East Indies	508,771
Italy	555,073
Japan	15,058,113
Formosa	183,412
Korea	60,000
Mexico	919,338
Peru	313,122
Philippine Islands	30,336
Portugal	6,274
Roumania	160,783
Russia	24,455,340
Servia	213,308
Spain	4,125,894
Spitzbergen	2,316
Sweden	246,808
Switzerland	5,000
Turkey	771,203
United States	418,038,117
Total for the world	1,113,308,386

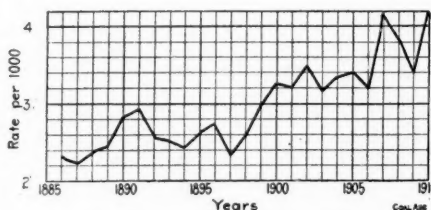
Coal Mine Mortality Statistics

By Frederick L. Hoffman*

Carefully compiled and accurate statistical data on the death rate in North American mines. The rates are computed on the basis of the number of men employed, and show an almost continual advance, being especially rapid during the past decade.

*Statistician, Prudential Insurance Co., Newark, N. J.

ation it is hoped that the succeeding years will show a still further lessening in loss of life, and a corresponding increase in efficiency in mining methods and mineral utilization.



INCREASE IN MORTALITY RATE
1886-1910

It is true, of course, that the rates during 1908 and 1909 were lower than

during 1907, when the rate was materially increased by a number of disasters of exceptional magnitude. The decrease, however, did not justify the assumption that the reduction was the result of the co-operation of inspectors, miners, mine owners and the Bureau of Mines, except in certain well defined and strictly limited directions, which do not require to be considered at this time. The chief object for calling attention to the glaring inconsistencies of the statement referred to, and the facts which are a matter of official record, is to emphasize the lamentable truth that whatever has been done during recent years to bring about a reduction in the fatality rate does not justify the belief that measurable results of material importance have been thus far secured.

As is well known, the year 1907 was an exceptionally disastrous one in American mining. A comparison of 1908 and 1909 with the record of 1907 is obviously misleading when it is assumed that the lower fatality rate during these two years was brought about by deliberate measures for accident prevention. Comparing 1908 with 1907, there was an actual reduction in the number of accidents equivalent to 22 per cent., and comparing 1909 with 1907, there was a reduction of 23 per cent. But comparing 1909 with 1908, the actual number of accidents was almost the same, and the reduction in the rate, making allowance, of course, for the number employed, was only 12 per cent.

The production of 514,392,000 short tons of anthracite and bituminous coal during 1910 involved the loss of 3051 lives in 21 states and provinces of the United States and Canada. The loss of life exceeded that for the corresponding period in 1909, when, according to the corrected returns, there were 2417 fatalities. The actual excess of deaths during 1910 over 1909, was, therefore, 634, showing an increase of 26.23 per cent.

The fatality rate for 1910 was 4.18 per 1000 persons employed, against 3.39 for 1909. The fatality rate for 1910 was therefore, 0.79 per 1000 higher than during the preceding year, an excess equivalent to 23.3 per cent. The rate for 1910 was the highest on record during the last decade, the nearest approach thereto having been 1907, when the rate was 4.15 per 1000.

BUREAU OF MINES CONTRADICTED

This comparison of the record for 1910 with 1909 is upon the basis of the official returns furnished by the mine inspectors of the different states. The facts derived from trustworthy sources, therefore, contradict the statement made in the program of the National Mine Safety Demonstration under the auspices of the U. S. Department of Mines that:

The coöperation of inspectors, miners, mine owners and the Bureau of Mines in the effort to reduce loss of life has resulted in a decrease of 25 per cent. in fatal accidents in 1908 and 1909, the last two years for which figures are available, and with continued earnest coöper-

Comparing the record for the last two years with every other year in the history of American mining except 1907, the actual loss of life has been greater, and the corresponding fatality rate has been in excess of the rate for any other year. The record for the two years, 1908 and 1909, is not one to be proud of, or to be referred to as showing evidence of a material reduction in the loss of life as the result of deliberate efforts or co-operation between existing agencies for that purpose. The loss was exceedingly high actually and relatively, and the de-

of fact, in the fatal accidents due to powder explosions, missed shots, etc. (which are particularly subject to reduction by education, improved methods of shot firing and handling of explosives), there was an increase from 73 in 1908 to 108 during 1909.

We may, therefore, take the two groups of causes, which are especially related to the present-day efforts toward accident reduction. According to the official statistics, as published by the U. S. Geological Survey, there were 469 deaths from these two groups of causes during 1908

on the other hand an actual increase in the deaths from falls of roof of 111, equivalent to 10.3 per cent. It requires to be said that there was a reduction in the miscellaneous causes. This may or may not have a relation to the efforts to reduce casualties in mining; only the detailed analysis could bring out the facts.

FATALITIES DURING 1901 TO 1910

The number of persons killed by accidents in the coal mines of North America during the decade ending with 1910,

(TABLE I)
NUMBER OF PERSONS KILLED IN THE COAL MINES OF NORTH AMERICA, 1901-1910

	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1901-1910
Alabama	41	50	57	84	185	96	154	108	129	238	1,142
Colorado	55	73	40	89	60	88	99	61	99	319	983
Illinois	99	99	156	157	199	155	165	183	213	406	1,832
Indiana	24	24	55	34	47	31	53	45	50	51	414
Iowa	27	55	21	31	24	37	35	38	28	39	335
Kansas	10	30	36	16(a)	36	30	52	31	35	25	301
Kentucky	21	19	25	19	31	40	32	40	33	84	344
Maryland	12	11	16	12	16	13	5	12	19	17	133
Michigan	6	6	8	7	8	6	7	6	9	6	69
Missouri	15	10	17	11	11	16(b)	8(a)	10	21	16	135
Montana	7	12	5	9	8	13	14	21	12	13	114
New Mexico	9	17	17	15	5	9	31	34	18	14	169
Ohio	72	81	124	118	114	126	153	112	115	162	1,177
Oklahoma	44	60	33	30	44	39	32	44	23(b)	46	395
Penn. anthracite	513	300	518	595	644	557	708	678	567	601	5,681
Penn. bituminous	301	456	402	536	479	477	806	572	506	539	5,074
Tennessee	44	226	26	28	29	33	31	34	31	38	520
Utah	9	8	7	9	7	7	8	8	16	15	94
Washington	27	34	25	31	13	21	37	25	39	43	295
West Virginia	134	120	159	140	194	269	356	625	364	320	2,681
British Columbia	102	139	42	37	12	15	31	18	57	28	481
Nova Scotia	14	19	31	19	20	28	35	39	33	31	269
Total	1,586	1,849	1,820	2,027	2,186	2,106	2,852	2,744	2,417	3,051	22,638

(a) Six months only.
(b) Eight months only.

(TABLE II)
FATAL ACCIDENTS IN THE COAL MINES OF NORTH AMERICA, 1901-1910
RATE OF PERSONS KILLED PER 1000 EMPLOYED

	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1901-1910
Alabama	2.90	2.79	2.94	4.77	10.75	5.23	7.61	5.75	6.40	10.81	6.15
Colorado	6.88	8.11	3.89	8.26	5.05	7.32	7.67	4.25	7.53	21.60	8.39
Illinois	2.24	2.15	3.13	2.87	3.36	2.49	2.47	2.58	2.93	5.44	3.05
Indiana	1.98	1.83	3.64	1.91	2.63	1.58	2.79	2.36	2.64	2.41	2.38
Iowa	2.05	4.23	1.59	1.90	1.36	2.20	2.05	2.20	1.56	2.17	2.09
Kansas	1.05	3.22	3.61	3.09 a	2.97	2.95	4.35	2.74	2.83	2.26	2.92
Kentucky	2.15	1.58	1.85	1.37	2.06	2.39	1.82	2.15	1.76	3.97	2.19
Maryland	2.23	1.89	2.82	2.11	2.57	2.10	0.85	2.00	3.34	2.93	2.28
Michigan	3.26	4.24	2.54	2.58	2.16	2.83	2.43	1.94	3.04	2.43	2.62
Missouri	1.63	1.09	1.85	1.09	1.06	1.65 b	1.70 a	1.06	2.31	1.55	1.48
Montana	3.24	6.19	2.32	3.59	3.67	5.43	5.12	6.68	3.11	3.16	4.19
New Mexico	4.81	10.11	7.26	7.61	2.35	3.82	10.13	9.26	5.57	4.89	6.71
Ohio	2.15	2.16	3.00	2.57	2.58	2.71	3.20	2.23	2.45	3.32	2.66
Oklahoma	8.35	9.62	5.42	3.63	5.76	4.81	4.15	3.02	2.78 b	5.43	4.90
Penn. anthracite	3.47	2.03	3.41	3.69	3.83	3.35	4.19	3.89	3.31	3.57	3.49
Penn. bituminous	2.56	3.36	2.65	3.44	2.90	2.76	4.40	3.15	2.72	2.79	3.09
Tennessee	5.23	25.80	2.69	2.81	2.76	3.07	2.79	3.06	2.62	3.40	5.03
Utah	5.06	3.24	3.21	4.06	3.57	3.69	3.07	2.99	5.36	4.38	3.89
Washington	5.59	7.83	5.13	6.69	2.61	4.08	6.05	4.68	6.81	7.15	5.67
West Virginia	4.14	3.41	4.03	3.08	3.88	5.20	6.33	10.35	5.85	5.00	5.39
British Columbia	25.67	34.65	9.85	8.31	2.72	3.12	5.12	2.95	8.88	3.61	9.21
Nova Scotia	1.83	2.36	2.79	1.63	1.86	2.31	2.89	3.02	2.73	2.82	2.46
Average	3.21	3.48	3.16	3.33	3.40	3.20	4.15	3.84	3.39	4.18	3.56

a Six months only.
b Eight months only.

tails do not furnish proof of a perceptible influence as the result of the agencies referred to in the quotation.

COMPARISON OF ROOF FALL AND EXPLOSION FATALITIES

It is true that, comparing 1909 with 1908, there was a decrease in the number of deaths due to gas or dust explosions. This decrease was from 396 to 341, but it may have been purely accidental and not the result of the coöperative efforts referred to. As a matter

against 449 in 1909, or an actual reduction of 20 deaths, equivalent to only 4.26 per cent. The corresponding facts for 1910 are not as yet available.

Far more significant than the foregoing comparison is the fact that, while in 1908 there were 1080 deaths due to falls of roof or coal, the number of deaths from this group of causes during 1909 was 1191. So the actual reduction in fatal accidents due to explosions, etc., during 1909, as compared with 1908, was only 20, or 4.3 per cent., while there was

is shown in detail in Table I. The table has been corrected for previous years and is, therefore, not strictly comparable with the table published in the *Engineering and Mining Journal* for Dec. 31, 1910. Such corrections are inevitable in the present state of mine inspection and the methods which prevail in giving publicity to the facts.

All tabulations of this kind are impaired by the lack of precise definitions of terms. What is considered a fatal accident in one state is not necessarily

considered as such in another. A uniform definition of a fatal accident on the part of all the mining bureaus is desirable. It should not be difficult to come to an understanding on this point and secure, if necessary, the required changes in the mining laws of the several states. It would seem a reasonable compromise to insist that all mine accidents terminating in death within one week after their occurrence should be returned as fatal, since a longer period would involve many uncertainties which would tend to further impair the accuracy of the results.

During 1910 there occurred 3051 fatal accidents in the coal-mining operations of North America, against 2417 during the previous year. In the aggregate there have been 22,638 fatal accidents in coal mining during the decade ending with 1910, or an average of 2264 a year.

West Virginia with 320, and Colorado with 319.

FATALITY RATE PER 1000 DURING 1901 TO 1910

Table II shows the fatal accident rate in coal-mining in the United States and Canada, calculated in the usual manner, upon the basis of the average number of persons employed in mining operations. For certain purposes it would perhaps be more useful to calculate the fatality rates upon the basis of the average number employed underground, but since this would require a separation of underground and outside fatalities, an element of uncertainty would be introduced in the calculations which is eliminated by the use of the returns as a whole.*

During 1910 the fatality rate was 4.18 per 1000 against an average rate of 3.56

Mexico, with 4.89; Oklahoma, with 5.43; Utah, with 4.38; Washington, with 7.15; and West Virginia, with 5 per 1000. The lowest rate for the year was reported for Missouri, or only 1.55 per 1000. The states with the next lowest rates were: Iowa, where the rate was 2.17; Kansas, with 2.26; Indiana, with 2.41; and Michigan, with 2.43.

The highest average fatality rate for the decade ending with 1910 was for the province of British Columbia, or 9.21 per 1000, followed by the State of Colorado, with an average of 8.39. The lowest averages were reported for Missouri, where the rate was only 1.48 per 1000, followed by Iowa, with a rate of 2.09.

(TABLE IV)

TWENTY-FIVE YEAR RECORD OF THE FATAL ACCIDENTS IN THE COAL MINES OF NORTH AMERICA 1886-1910

	Number of Employees	Number Killed	Rate per 1000 Employed
1886	222,020	514	2.32
1887	230,834	514	2.23
1888	278,175	659	2.37
1889	278,361	681	2.45
1890	301,295	853	2.83
1891	326,684	959	2.94
1892	343,564	883	2.57
1893	384,249	970	2.52
1894	394,146	962	2.44
1895	404,553	1,061	2.62
1896	409,320	1,123	2.74
1897	409,830	956	2.33
1898	407,536	1,056	2.59
1899	421,489	1,250	2.97
1900	464,235	1,507	3.25
1901	494,287	1,586	3.21
1902	530,624	1,849	3.48
1903	576,365	1,820	3.16
1904	609,001	2,027	3.33
1905	613,225	2,186	3.40
1906	658,880	2,106	3.20
1907	686,460	2,852	4.15
1908	715,355	2,744	3.84
1909	712,550	2,417	3.39
1910	730,707	3,051	4.18
1886-1890	1,310,694	3,221	2.46
1891-1895	1,853,196	4,835	2.61
1896-1900	2,112,410	5,892	2.79
1901-1905	2,853,502	9,468	3.32
1906-1910	3,503,952	13,170	3.76
1886-1910	11,633,754	36,586	3.14

(TABLE III)
FATAL ACCIDENTS IN THE COAL MINES OF NORTH AMERICA
COMPARISON OF 1910 WITH THE FIVE PREVIOUS YEARS

	Number of persons killed		Rate per 1000 Employed		Increase or Decrease of Rate
	1905-1909	1910	1905-1909	1910	
Alabama	134	238	7.09	10.81	+ 3.72
Colorado	81	319	6.33	21.60	+ 15.27
Illinois	183	406	2.76	5.44	+ 2.68
Indiana	45	51	2.39	2.41	+ 0.02
Iowa	32	39	1.87	2.17	+ 0.30
Kansas	37	25	3.18	2.26	- 0.92
Kentucky	35	84	2.03	3.97	+ 1.94
Maryland	13	17	2.17	2.93	+ 0.76
Michigan	7	6	2.44	2.43	- 0.01
Missouri	13	16	1.52	1.55	+ 0.03
Montana	14	13	4.75	3.16	- 1.59
New Mexico	19	14	6.71	4.89	- 1.82
Ohio	124	162	2.63	3.32	+ 0.69
Oklahoma	36	46	3.93	5.43	+ 1.50
Penn., anthracite	631	601	3.72	3.57	- 0.15
Penn., bituminous	568	539	3.20	2.79	- 0.41
Tennessee	32	38	2.86	3.40	+ 0.54
Utah	9	15	3.79	4.38	+ 0.59
Washington	27	43	4.94	7.15	+ 2.21
West Virginia	362	320	6.44	5.00	- 1.44
British Columbia	27	28	4.79	3.61	- 1.18
Nova Scotia	31	31	2.58	2.82	+ 0.24
Average	2.461	3.051	3.60	4.18	+ 0.58

These totals do not exactly correspond to the figures published by the Bureau of Mines, since for certain states, in the present tabulation, the returns are by fiscal years and not by calendar years. The recommendation frequently made, that the returns should all be for calendar years, may be repeated, for unless the returns are made on a monthly basis it will be impossible to secure an accurate and complete annual tabulation.

It is a significant fact that, during 1910, the number of reported fatal accidents in the twenty-one states and provinces is, for the first time in our mining history, in excess of three thousand. The highest previous records had been for 1907, when there were 2852, and 1908, when there were 2744 deaths. On the basis of actual numbers, the loss of life was greatest in the Pennsylvania anthracite region, where 601 deaths occurred, followed by the bituminous region of Pennsylvania with 539, Illinois with 406,

for the decade. The highest previous rate occurred in 1907, when it reached 4.15 per 1000, and the lowest rate occurred in 1903, when it was 3.16. Even the minimum rate is decidedly above the average fatality rate of foreign countries, which, during the ten years ending with 1908, was only 1.53 per 1000.

During 1910 the highest rate prevailed in Colorado, where it attained to the extraordinary proportion of 21.6 per 1000. The only higher rates reported for any one state and year of the decade under review were for British Columbia, 25.67 for 1901 and 34.65 for 1902; and for Tennessee, 25.8 for 1902. Next to the State of Colorado the highest rate during 1910 is reported for Alabama, where it attained 10.81 per 1000. Other states with rates above the average for the year were: Illinois, with 5.44; New

*For an extended discussion of fatal accidents in coal mining, by occupation, nativity, causes, etc., see Bulletin No. 90 of the Bureau of Labor, Washington, D. C., 1910.

RATE FOR 1910 COMPARED WITH THE PREVIOUS FIVE YEARS

Table III exhibits the fatal accidents in coal mining in 1910, compared with the average for the preceding five years, both upon the basis of actual numbers and the rates per 1000 employed. Many of the states and provinces show an increase in the rate during 1910 over the average for the preceding five years, the exceptions being Kansas, Michigan, Montana, New Mexico, Pennsylvania (anthracite and bituminous), West Virginia and British Columbia.

The net increase in the rate during 1910 was 0.58 per 1000 over the average rate for the five years ending with 1909. The record shows that the rate increased in 13 out of the 21 states and provinces, but this increase was largely the result of a few disasters of exceptional magnitude. However, the record for nearly all of the states and provinces is not one

which warrants the assurance that material progress is being made in the reduction of the preventable loss of life in coal-mining operations in the United States and Canada.

STATISTICS FROM 1886 TO 1910

Table IV affords a means of convenient comparison of the fatality rate in coal mining during 1910 with the corresponding rates for the previous 24 years. The quarter-century review is extremely interesting and peculiarly suggestive, in view of the unwarranted assertions that the rates during the last few years have considerably declined, due to the intelligent co-operation of government and state offi-

cials, mine managers, miners and others interested in the subject.

The accompanying profile shows graphically the fluctuations in and gradual increase of the death rate during this period. It will be noticed that the low rate in 1887 of 2.23 per 1000 has never since been even closely approached, with the exception of 1897, when it dropped to 2.33. Immediately after this the profile shows a rapid and uniform increase, crossing the 3 per 1000 line for the first time in 1900, since which date it has never been below this point. The comparatively level line during the period 1900 to 1905 may have given rise to false hopes, which were, however, quickly dis-

pelled by the most abrupt and erratic fluctuations yet in evidence, during the period 1905-1910. During this time the rate has twice crossed the 4 per 1000 line, and the general average has been higher than for any previous existing record.

The total number of lives lost, as far as reported, during the 25 years ending with 1910, was 36,586. If allowance is made for accidents not reported, and for the small mining states not included in the present review, it is safe to assume that during the last 25 years not less than 40,000 lives have been lost in coal-mining operations in the United States and Canada.

American vs. English Mine Fatalities

By J. T. Beard

Conditions affecting death rate peculiar to American mines. Two methods of estimating death rate. Estimation on a tonnage basis more nearly approximates what death rate should show. Pennsylvania death rates, 1908-1910, lower than those of Great Britain. Output per man double that in England.

Numerous comparisons have been made, from time to time, during the past few years, of the fatalities of coal mining in this and other countries. These comparisons have, in many instances, shown a comparatively high death rate in the United States. In other instances, in spite of the modifying influences that operate to increase the death rate here, a comparatively lower rate of fatality has been shown.

Briefly stated, some of the more important influences at work in this country and which all will admit are peculiar to the United States, are as follows: the large influx of foreign labor seeking employment in any capacity; the unprecedented demand for coal, incident to a new and rapidly growing country of large area and resources; the rapid development of the coal industry in the United States within less than half a century. Other conditions might be mentioned that imperil our mining and require the most thoughtful consideration on the part of all, in order to reduce the list of fatalities in mines to a standard that will comport with our aims and aspirations as a nation.

For the purpose of this article, however, the conditions named—influx of foreign labor; demand for coal; and rapid development of mines—are sufficient. We desire to be fair and make no unjust claims for ourselves; but we feel, rightly, that much has been spoken and written, in this regard, tending to cast unwarranted reflections on American mine management.

American institutions have always embodied the highest ideals, sought out the widest knowledge and experience, and studied to adopt the most approved methods. American mine management has supplemented its own careful study of mining conditions here and elsewhere by calling to its aid mining men of other countries, hoping to glean from their observations in our mines some enlightenment on the questions mining men, the world over,

are studying today. Some have sharply criticized this action as undignified and productive of no practical good, inasmuch as conditions in American mines differ widely, not only from conditions prevalent in foreign mines, but in mines in different parts of our own country.

The study of conditions must ever be supreme in the solution of all important mining problems. The broadest and most capable minds will always study closely not only the conditions of their own environment, but that of others. History is the only sure interpreter of the future when the application of past experience to present conditions is made intelligently. To consult others and study their experience does not imply that the student or inquirer has no experience of his own, or that such experience is any less valuable than that of others. It rather shows wisdom and intelligent foresight with a desire to improve.

But to return to the question of comparative death rates in mining, it has long seemed to me that the manner of estimating the fatalities per 1000 men employed is not an equitable basis. It would seem that in order to make a full and equitable comparison of the fatalities incurred in mining, the estimation should be based on the number of men employed in the

mine, the number of hours employed, and the degree of danger, which varies, being different in different mines, and for which the mine management is in no way responsible.

A little reflection will make clear the injustice of classifying in the same category a mine in which 350 inside men are putting out 1000 tons of coal each working day, with another where twice that number of men produce but 800 or 900 tons a day. At once the question is asked: "Wherein lies the difference; are not these mines equally dangerous?" According to the present accepted basis, the mine last named, employing more men and producing less coal, would show a lower death rate on the number-of-employees basis, but a higher death rate on a tonnage basis, for the same number of fatalities, than the first mine where fewer men put out more coal.

It will be generally conceded that, for the same efficiency of mine management, the number of fatalities may naturally be expected to depend on three principal factors; namely, number of men in mine, number of hours worked, and degree of danger to which the men are commonly exposed in the particular mine in question. The number of fatalities would increase with the number of men and hours of employment and the danger. The last named factor—the particular danger of the mine—though dependent on physical conditions that are impossible to forecast, may be gaged more or less correctly by the output per man per hour, varying inversely as such unit output or tonnage. The hours of employment will evidently vary as the tonnage of the mine and inversely as the number of men, or as the tonnage per man.

Writing these factors out, or expressing their relation algebraically, they reduce as follows:

$$\text{Fatalities vary as } (\text{men}) \times (\text{hours}) \times (\text{danger})$$

$$\text{Hours vary as } \frac{\text{tonnage of mine}}{\text{men employed}}$$

Danger varies inversely as $\frac{\text{tonnage of mine}}{\text{men} \times \text{hours}}$

or

Danger varies directly as $\frac{\text{men} \times \text{hours}}{\text{tonnage}} =$

$$\frac{\text{men}}{\text{tonnage}} \times \frac{\text{tonnage}}{\text{men}} = 1$$

Hence,

$$\text{Fatalities vary as } (\text{men}) \left(\frac{\text{tonnage}}{\text{men}} \right) \times 1 \\ = \text{tonnage}$$

If the foregoing analysis can be taken as representing with a fair degree of approximation the relative number of fatalities that may justly be expected in mines operated under various physical conditions beyond the control of the management, it would follow that the degree of efficiency with which the mines are managed would be properly represented on a tonnage basis. In other words, the death rate should then be expressed as the ratio of the number of fatalities to the tonnage

former being practically double the latter. This item alone serves to emphasize the urgency of the demand for coal in American mines, or the tendency of the miner to increase his tonnage, as it cannot be assumed that any physical condition operates in both the hard- and soft-coal mines here to increase the average output per man so as to make it double that in English mines.

It is also interesting to note, after what we have remarked in reference to the true basis for estimating the death rate in mines, that, in the table, the English death rate per 1000 men employed is lower, for each year, than the corresponding rate for the same respective years in Pennsylvania. On the other hand, the English death rate per million tons of coal mined is higher, year by year, than the corresponding rates in the American mines. The question naturally is suggested, which of these is the proper rating as indicating the relative efficiency

TABLE SHOWING PRODUCTION OF COAL, NUMBER OF MEN EMPLOYED, FATALITIES AND DEATH RATES, AND AVERAGE ANNUAL OUTPUT PER MAN 1908-1910, INCLUSIVE, PENN. ANTHRACITE, PENN. BITUMINOUS AND GREAT BRITAIN

Year	Production (tons)	EMPLOYEES			Total Fatalities	DEATH RATE		Average Annual Output per Man (Tons)
		Inside	Outside	Total		Per 1000 Men	Per 1,000,000 Tons of Coal	
	PENNSYLVANIA ANTHRACITE							
1908	83,543,243	124,233	50,270	174,503	678	3.88	8.12	672
1909	80,223,833	123,272	47,923	171,195	567	3.31	7.07	651
1910	83,683,994	121,542	46,633	168,175	601	3.57	7.18	689
	PENNSYLVANIA BITUMINOUS							
1908	114,937,375	152,536	29,304	181,840	572	3.15	4.98	753
1909	136,205,695	152,424	33,497	185,921	506	2.72	3.72	893
1910	148,770,858	159,671	33,817	193,488	539	2.78	3.63	932
	GREAT BRITAIN							
1908	261,512,214	796,329	191,484	987,813	1,306	1.32	5.01	329
1909	263,758,562	818,381	195,617	1,013,998	1,453	1.44	5.51	323
1910	264,292,588	848,381	201,026	1,049,407	1,769	1.68	6.69	314

of the mine, and not to the men employed. This seems to me a more fair basis of comparison.

The following table is interesting as showing the production, number of men employed inside and outside the mine, total number of fatalities, and the death rate, per 1000 men employed below and above ground and per 1,000,000 tons of coal mined, besides the average annual output per man in the mine, for the past three years, 1908-1910, inclusive, in the anthracite and the bituminous mines of Pennsylvania, as compared with the same data in the mines of Great Britain, as compiled from the mining report of the Department of Mines of Pennsylvania, 1910.

Referring to this table it is interesting to note the large average annual output per man in the Pennsylvania mines, both anthracite and bituminous, as compared with that of English mines, the

of the mine management; for that is what we expect the death rate to show.

Taking the tonnage basis as the proper method of estimation, which I believe is a nearer approximation to what it is desired to show, the death rates for these years are lower in the American than in English mines. It will be observed also that the death rate, on this basis, has uniformly decreased in Pennsylvania during this period, year by year, while in English mines the rate for the same years shows a uniform increase.

Electric cables for mine use should be incased in iron pipes or well tarred wooden troughs. All jointing should be most carefully done or serious accidents resulting in loss of life may follow. Wrap all joints with tape and ram in with bitumen. In gaseous mines all electrical machinery should be inclosed so as to be flame-proof.

Leased and Owned Coal Lands

A preliminary statement of the statistics of tenure of coal lands by operators in the United States for the year 1909 was recently issued by Director Durand of the Bureau of the Census of the Department of Commerce and Labor.

In regard to these statistics, it should be noted that they cover the holdings of none but coal-mine operators, and for these operators include no acreage but that of mineral lands, that is, other acreage held by operators, some of which may or may not contain coal, and the surveyed lands of nonoperators are not included in these figures. The total number of acres controlled and the total anthracite holdings of the United States and of Pennsylvania are exclusive of 10,975 acres of anthracite coal land sublet by operators to each other and reported twice.

It is significant that the only increase in the acreage of anthracite lands has been made in the division of lands owned by the operator, while the number of acres of land developed under lease has decreased. This is explained by the fact that the larger producers of anthracite bought large areas of coal lands several years ago to hold as reserve supplies. Since royalty must be paid continuously on coal land held under lease, whether coal is mined or not, the leased lands are not conserved, but are mined out steadily. This, in part, accounts for the decrease in the acreage of anthracite lands held under lease, and it is in part accounted for by some occasional purchases of leases by large operators, thereby changing the form of tenure from held under lease to owned property. The increase in the number of acres of mineral land reported as owned is due not only to lands acquired, but also in part to the classification as mineral lands of lands previously held by large producers, but not determined as coal-producing areas.

COAL LANDS OWNED AND LEASED BY OPERATORS IN PRINCIPAL COAL-PRODUCING STATES DURING 1909

	Acres Controlled	Acres Owned	Acres Held Under Lease
United States. (1)	6,906,088	4,782,170	2,134,893
Anthracite.. (1)	274,870	183,144	102,701
Bituminous..	6,631,218	4,599,026	2,032,192
Pennsylvania. (1)	1,927,829	1,509,425	429,379
Anthracite.. (1)	274,010	183,044	101,941
Bituminous..	1,653,819	1,326,381	327,438
West Virginia..	1,147,527	590,885	556,642
Alabama.....	612,026	538,122	73,904
Illinois.....	553,711	398,090	155,624
Ohio.....	408,413	260,423	147,990
Indiana.....	141,272	104,938	36,334

(1) Exclusive of 10,975 acres of anthracite lands reported twice in totals for acres owned and acres held under lease.

Reviews of Coal Industry for 1911

The coal industry during the year now closed is remarkable rather for what did not occur, than because of any new features developed. No important departures in the science of mining or in mining appliances have been made, nor has the country been visited by such an extended series of holocausts as caused a veritable reign of terror in several previous years. That it has met with many troubles and disappointments cannot be denied, but it has acquired confidence in meeting and overcoming these and has gathered new strength.

In common with a number of recent years, 1911 witnessed further consolidations of corporate interests in which the coal industry figured prominently. The economies possible to effect by such consolidation are fully appreciated by capital and the ensuing years will no doubt bring forth larger and stronger combinations along these lines. An entirely new development, in this direction, has been the organization of a National Coal Operators' Association, only yet in its infancy.

Reports from state mine inspectors, special correspondents and others with estimates of the year's production and outlook for 1912.

In production, this year has been a good one, since the output has nearly equaled that of 1910, but this, unfortunately, does not bespeak an entirely satisfactory business, because of the low coal prices that prevailed. It is true also that general industrial conditions are all below normal, and the heavy tonnage, thrown on an already weakened market, have produced a condition bordering on demoralization. With the productive capacity of our mines far in excess of the average normal consumption, such conditions will continue to prevail until some system of regulation is

inaugurated, and it is such problems as these that have made necessary the operators' organization.

The export shipments for the year show an unprecedented increase which is, however, hardly normal because largely due to the labor troubles in British Columbia. That the United States is forging to the front as a fuel exporter is becoming clearly evident, and that this may eventually become an outlet for our over-production seems reasonable to believe.

Labor troubles during the year of 1911 have amounted to practically nothing. During the present year, however, the industry will face the most important wage conference in the history of the country, when the present agreements all expire simultaneously April 1.

The present year will inherit some of the problems of the old one, and no doubt develop new ones of its own, but the confidence gained in overcoming the difficulties of 1911 will do much to engender a spirit of optimism in the coal industry.

Coal Industry of Alabama in 1911

SPECIAL CORRESPONDENCE

The production for the year 1910 was 16,139,228 tons, but is not expected to go so high in the present year, the chief mine inspector estimating it at about 14,500,000 tons.

The labor supply has been fair all year, with the exception of a temporary shortage toward the latter part of the summer when mines which had been closed down were started up and other mines put in more regular operation. The year has been free from strikes or other disturbances of like nature.

The production of coal was low during the spring and early summer as the market conditions were not as good as during that period of 1910, for during that year, strikes in the coal fields of Illinois and Oklahoma helped conditions here greatly. Also furnace requirements have not been as large this year as in 1910.

In regard to the labor supply, it should be said that as far as actual numbers on the rolls are concerned, there is little or no difficulty. We have usually had a sufficient number of men enrolled to operate our plants, but many of these are inefficient workmen, who work so irregularly that it is impossible to rely on them. Mining is rendered hazardous by the employment of a shifting force of men, and profits are curtailed when the daily output is liable to be reduced by the unforeseen absence of some of the men.

Colorado Coal Industry in 1911

BY JAMES DALRYMPLE*

The coal business in Colorado for the year 1911 has not been quite so lucrative as it was in 1910, although the output has been normal and satisfactory, all things considered.

The larger production of last year was due to the demand from markets which were affected by the miners on strike in Illinois, Kansas, Arkansas and Oklahoma; the needed supply being drawn from the Colorado fields.

Then, too, the adverse financial condition and business lethargy of the entire country have had considerable bearing on the coal industry. The disturbed industrial condition in Boulder and Weld counties where lignite is mined has continued uninterruptedly since last year, with no prospect of an immediate settlement. Otherwise coal production has been steady and found a brisk market. Prices have advanced from 25 to 50c. per ton on domestic coals.

Operators have had to cope with the usual shortage of cars in the last four months of the year, which always hampers the production materially and retards the meeting of the market's demands. The working force for 1911, which was 13,813, shows a reduction of 955 men, as compared with 1910, when 14,768 men were employed. There is a decrease in the tonnage of coal produced during 1911 of 2,029,026 tons.

*Inspector of coal mines, Denver, Colo.

The death rate is low, being 6 per 1000, which compares favorably with other years in Colorado. The nonfatal accidents number 248, as compared with 146 in 1910. Surface fatal accidents numbered six, and underground fatal accidents totaled 82.

A dust explosion, augmented by powder, occurred at the Cokedale mine, owned by the Carbon Coal & Coke Co., of Las Animas County, on February 9, 1911, in which seventeen lives were lost. This was the only catastrophe during the year.

The mining laws of Colorado are faulty, but after the Governor appointed a commission to amend and improve the present laws, which commission worked faithfully for five months, the Governor felt it incumbent upon him to veto the bill, as it was mutilated beyond all recognition.

The following is a summary of the coal production in Colorado in 1911:

SUMMARY OF THE COAL PRODUCTION OF COLORADO IN 1911

Number of mines in operation	158
Tons of lignite coal produced	1,676,975
Tons of semibituminous coal produced	761,526
Tons of bituminous coal produced	7,502,981
Tons of anthracite coal produced	64,379
Tons of unclassified coal produced, estimated.....	70,000
Total number of tons produced	10,075,861
Decrease in 1911.....	2,029,026
Total number of tons of coke produced	946,284
Total number of coke ovens in operation	2,764
Total number of employees in and about the mines..	13,813.3
Total number of days worked	188.7

The Illinois Coal Industry in 1911

Special Correspondence

The fiscal year which ended June 30, 1911, showed only 53 counties producing coal in Illinois as against 55 in the previous year. The number of mines and openings had also reduced from 881 to 845, a drop of 36 mines. In the fiscal year 184 mines were newly opened or reworked, but in the same time 217 were closed or abandoned. Though there was a slight reduction in mines working, the whole tonnage produced rose from 48,717,853 tons in 1910 to 50,165,099 in 1911 or 2.97 per cent. There was a reduction of only 3 shipping mines in 1911.

Of the mines operating 458 engaged in local trade only. There were 33 less of these mines operating in 1911 than in the year before, the tonnage from them declining from 1,492,652 to 1,406,442. The total tonnage shipped in railroad cars was 44,578,400 tons as against 43,007,015 tons in 1910, but this gain was not equal through the range of sizes. Thus the amount of mine run gained largely. In 1910 only 10,220,456 tons were shipped; in 1911 the tonnage was 13,025,663 tons. There was consequently a loss in many of the sizes of screened coal. Lump coal declined from 20,769,930 to 19,588,409; nut, from 2,845,693 to 2,425,712 tons; slack, from 1,372,038 to 1,131,784. On the other hand, two sizes much shipped from Illinois mines showed increased use. Egg mounted from 3,334,059 tons to 3,725,073 tons, and pea coal similarly from 10,174,677 to 10,268,458.

The locomotive tender trade as supplied to the tenders at the mines fell with the decreased railroad business from 886,217 tons to 877,793 tons. The local trade also fell from 2,867,871 to 2,617,977 tons. There were consumed or wasted at the plants 2,090,929 tons whereas in 1910 the amount reported aggregated only 1,956,750 tons. The average operating days of shipping mines declined from 179 to 169 and all mines, shipping and domestic averaged only 165 days of work as against 171 days on the previous year.

PRICE LITTLE CHANGED BY WAGE INCREASE

The price per ton rose from an average of \$1.016 to \$1.101, or \$0.085. The gross selling value at tipple totalled \$56,064,494 as against \$50,204,207, an increase of 11.7 per cent. Motor haulage took a further advance. There are now 316 motors used, whereas in 1910 there were but 229,

a significant increase of 38 per cent. Mining machines were used in 126 mines, whereas in 1910 there were 114 mines in which they were to be found. The mining machines accordingly increased in number from 1289 to 1430. The number of tons undercut by machines was 19,998,259, whereas in 1910 it was 18,176,254 tons. In 1911 the number of tons hand-mined declined from 30,541,599 tons to 30,166,840 tons.

MEN EMPLOYED

In 1911 the miners employed numbered 39,912, having increased since 1910, when the number was only 39,069. In Illinois the number of other employees underground is large. In 1911, 30,052 persons other than miners worked in the mines and the number increased more than the number of miners. In 1910 there were but 28,137 not actually engaged in the mining of coal. The number of boys working underground dropped from 1154 to 1009. Above ground the boys employed rose from 47 to 71. The number of other employees above ground in 1911 was 6366; in the previous year there were 6227 of such operatives. The total number of employees above and underground increased from 74,634 to 77,410 persons. Thus the employees may be divided up as follows roughly: Miners, 51.6 per cent.; other underground adult employees, 38.8 per cent.; boys underground, 1.3 per cent.; boys above ground, 0.1 per cent.; adult employees above ground, 8.2 per cent.; total, 100 per cent.

Of the whole number of adult employees, 74,508 were employed at shipping mines in 1911, and 71,520 in 1910. The local mines employed 2902 in the last fiscal year. In 1910, 3114 men were thus employed. There were 70,973 working below ground in 1911 and in the year before, 68,360 were thus employed. The corresponding number for workers above ground in the coal mining industry of the state were 6437 and 6274.

MINING RATES AND CONSUMPTION OF POWDER

The average rate for hand-pick mining in the shipping mines per gross ton was \$0.627, an increase over the year before of three cents. Machine mining also cost 3.2 cents more, the price so advanced averaging \$0.494 per gross ton.

The number of kegs of powder used for coal blasting was 1,240,293; in 1910 1,254,095. Powder was used for other purposes to the extent of 3568 kegs last

year; in the previous years, the use reached 3128 kegs. Permissible explosives were used to the extent of 243,099 lb.

FATALITIES AND INJURIES NOT DECREASING

The Cherry mine disaster was so abnormally severe that it does not seem well to include it in making comparisons between the two last years. That disaster is omitted therefore from the 1910 calculations. Last year 157 men were accidentally killed, 7 men more than in the previous year. Of these 149 men were killed inside and 8 outside the mines. The deaths made 87 wives, widows, and left 245 children, fatherless. Injuries entailing the loss of a month or more totalled 709. In the previous year such accidents were more numerous, 742 men being so incapacitated. There were 319,523 tons mined for every life lost. In 1910 the record was a trifle more favorable, 324,786 tons. The number of employees per life lost was 493, whereas in 1910 the number was 498, so that if it had not been for the Cherry mine disaster, 1910 would have had a little better record than the past year.

For convenience in figuring, it may be well to add that deaths per thousand men employed ran 2.03 in 1911, and 2.01 in 1910, with the reservation referred to. In 1911, 70,754 tons were mined for every man severely injured and in 1910 only 65,657 were produced at the same loss and suffering. Out of every 109 men last year one man was injured. In 1910 that proportion was only 101 to 1. The number killed for each million tons produced was 3.1 in both the years considered. The number injured for every thousand men employed was 9.9 in 1910 and 9.2 in 1911. It will be observed that the figures for tonnage, activity and injuries, fatal and otherwise, are not materially changed. The compensation to labor has increased 5 per cent. for hand-pick work and about 6 per cent. for machine work.

The increase in the price of coal is probably due to the conditions obtaining after the strike and that price may decline in the following fiscal year. It will be seen that the operator made an increased gain of about 5c. on an increased product of 2.97 per cent.; not such a bad record for the year 1911, which has not appeared bright in other states. Moreover, improved haulage methods and increased machine mining should have added largely to that profit.

Note—From report of State Mining Board.

Indiana Coal Industry in 1911

By Frank I. Pearce*

Beginning with January, and slightly before, the demand for coal became less brisk and many of the mines that had been operating nearly full time, previous to and for a considerable time after the settlement of the strike in Illinois, were unable to work more than half time during January, February and March.

With the approach of milder weather, market demands grew weaker, competition stronger and selling prices took a drop. As a result of this condition many mines that had been working about half time were unable to operate more than one or two days a week and a number were closed down indefinitely, or to make repairs.

This condition continued through April, May, June, July, August and the first half of September resulting in considerable suffering among hundreds of idle

employees depending upon the mines for their livelihood, and in many instances a considerable outlay of money to the companies to keep their mines in repair. Even where this was done properly in many instances suffered a certain depreciation in value, that is, a fixed loss.

DEMAND FOR COAL IMPROVED

The latter part of September the demand for coal began to improve somewhat and from this period until Dec. 15 the mines averaged about half time, and a number that were closed down earlier in the year resumed operations. Market conditions grew a little stronger and selling prices advanced.

The coal production of any state is governed by the demand, number of days

*Deputy Inspector of Mines, Indianapolis, Ind.

worked and number of persons employed. The demand for coal has been poor for the year 1911 as compared with 1910 resulting in a greater loss of time, a larger number of employees being idle, and the production proportionately reduced.

PRODUCTION

The condition of the coal trade being somewhat similar to that of the year 1909 the production will be about the same, or possibly 14 million short tons, slightly in excess of what it was that year. However, this is only an estimate as the state's production has not yet been compiled for the year.

There were a number of strikes during the year but most of these occurred at a time when the demand for coal was such as to not seriously affect the state's output.

Coal Industry in Iowa

By L. E. Stamm*

In reviewing the coal industry of this state for the year just drawing to a close I am pleased to note that the conditions for the most part have been good and that the tonnage has reached the highest mark in production since coal mining first began in this state during 1840. In recent years the annual coal production of Iowa has increased steadily, except in the years 1908 and 1910, when a slight falling off in the production was noted, caused possibly by a suspension of the mines for a period of thirty days during each of those years, pending an agreement between the miners and operators relative to a wage agreement.

LARGEST TONNAGE EVER PRODUCED

Under the laws of the state of Iowa, statistics relating to the production of coal in the state are gathered for the fiscal year ending June 30. These statistics gathered for the last fiscal year show a production of coal amounting to 7,574,919 tons. This is the largest tonnage ever produced in this state, and while these are figures for the fiscal year, it would be safe to say that they will approximate those for the calendar year. In the production of the tonnage noted above, 16,571 persons, both miners and others, were employed in and around the mines, and the work of mining was fairly good during most of the year. The coal industry of Iowa, while not of such magnitude as in a number of states, still has much

to do with the general prosperity of the state.

Coal was first discovered and mined in Iowa in 1840, and at that time was mined in but one other state west of the Mississippi river. Only 400 tons were produced in 1840, while in 1857 the production had reached 1,231,547 tons. In 1882 it had reached 3,920,000 tons, while for the year 1899 more than 5,000,000 tons of coal were mined. Since then the output has steadily increased. As stated above, the tonnage for the fiscal year of 1911 was 7,574,919 tons.

COAL MINED IN 22 COUNTIES

Coal is mined in 22 counties in Iowa. The product is bituminous and of good quality. Some coal is shipped from this state into Nebraska, Minnesota and the Dakotas, but most of the coal produced is consumed within the borders of the state. Its manufacturing industries provide a market for most of the coal produced in Iowa, and on account of the absence of friction between the miners and operators of the state the coal industry has made a steady growth. Owing to the mild weather which has prevailed in Iowa from September onward, the coal production has not been quite so good as is usually the case at this time of year, but with the coming of cold weather we look for a steady demand for coal; one

*Secy. to Mine Inspectors, Des Moines, Iowa.

that will keep the mines of the state running on a fairly steady basis.

Owing to the extension of the Rock Island System from Des Moines south, a new coal field will be developed in Marion County during the coming year. Already the Rock Island company is starting the development of a new mine near Dallas, Marion County, and this mine will be equipped for a daily capacity of two thousand tons or more. Other mines will be developed in this section, so the outlook for the year 1912 seems at this writing to be bright for an increased coal production. However, the coming April marks the time for a new agreement between the operators and miners of the state and, judging from past years, there is likely to be a suspension of mining for thirty days or more at that time. This will affect the output for the coming year to some extent.

BUT FEW LABOR TROUBLES

There have been but few labor troubles affecting the production of coal in Iowa during the past year. A few local strikes have occurred, caused by a difference of opinion as to the terms of agreement between the operators and miners. For the most part these disagreements or strikes were of short duration, and did not affect the coal output to any great extent. Judging from past years, it would seem at this time that there will be an increase in the coal production of this state in 1912.

Coal Production of Kansas 1911

By LEON BESSON*

The coal production for the year 1911 will be approximately six million tons. It will be greater for the year 1911, than it was for the previous year, owing to the fact that in the year 1910 there was a long suspension of work, extending from April 1 to Sept. 22. On the other hand there have been few local labor troubles in the present year, and these not of any importance. An average of about 11,500 men were employed in the mines of the state. There have been a few mine explosions this year, causing the death of five shot-firers and two rescuers. I am of the opinion that the coal production will be steadily on the increase, for there is a tendency to go back to coal, as natural gas seems to be approaching exhaustion.

Maryland Coal Statistics for 1911

By J. H. DONAHUE†

From all the available data at hand, it appears that the coal production of Maryland for the year just closed will show an appreciable falling off. The production for 1911 as estimated, will be 4,500,000 short tons, as compared with nearly 5,000,000 tons in 1910 and 4,524,112 tons for 1909.

*State mine inspector, Pittsburg, Kans.

†Chief Mine Inspector, Frostburg, Md.

Maryland was particularly fortunate during the past year with respect to labor troubles, having experienced no inconvenience from this source whatever. It is estimated that the average days worked will be about 240, and the number of fatal accidents during the year will not total more than 15. The non-fatal accidents have not yet been reported.

North Dakota Lignite in 1911

By J. A. BLISS*

During the year 1911 there were ninety-eight coal mines in operation in North Dakota, producing about 395,000 tons of lignite. Over a thousand men were employed during the busy season which begins in October and closes in January. During the summer months the demand for lignite falls off, and as a result part of the mines are closed down. North Dakota mines are entirely free from explosive gases, and the list of fatalities and injuries has been low during the past year.

The demand for lignite is gradually increasing and several new mines have been opened up, while some of the larger operating mines have added to their equipment. Although the estimated amount of lignite within the state exceeds that of any other state in the Union, the demand for it is largely of a local nature,

and because of its abundance the selling price is so low that the margin of profit is small.

The question of timbering the mines is a serious one, as dependence has to be placed on timber shipped in from Minnesota, largely, though some is obtained from the Western states.

The state legislature has wisely seen fit to lend active support to the furthering of its lignite industry, and all public institutions are required to use coal mined within the state. An appropriation has been set aside for the purpose of establishing and maintaining an experiment station. This has been located at Hebron, where a mine has been purchased by the state and an excellently equipped building erected. This station is under the direction of the State School of Mines at Grand Forks, and its efforts are largely directed toward perfecting the briquetting process and of making commercial use of the volatile gases which run high in all lignite.

The successful development of a process of briquetting on a commercial basis and of making use of the volatile gases for illumination, heat and power would create at once a demand for lignite and open a large field for investment.

The recent advent of several new branches of railroad in the western part of the state has made accessible a new portion of the coal fields, and a greater gain in production is anticipated for the ensuing year than heretofore.

Montana Coal Industry in 1911

By J. B. McDermott*

Montana is the third largest state in the Union and contains more square miles area, than New York, New Jersey, New Hampshire, Maine, Massachusetts, Maryland, Rhode Island, Connecticut, Delaware and Vermont combined. It is underlain with coal, ranging in quality from lignite to sub-bituminous, semi-anthracite and anthracite; the latter has not been found in workable quantities.

PRODUCTION FOR 1911

Legislative action, in creating the county of Musselshell out of portions of Fergus, Meagher and Yellowstone Counties, has not decreased the production of coal, but Fergus and Yellowstone are, for a time, reduced from large producers by the change of county lines.

The following is the production by counties in short tons for year ending Oct. 31, 1911:

PRODUCTION BY COUNTIES	
	Tons
Carbon	1,226,783
Cascade	948,823
Musselshell	643,648
Park	54,760
Choteau	14,127
Gallatin	10,801
Fergus	6,670
Custer	5,044
Valley	2,741
Total	2,913,397

The capacity of Montana's mines has been materially increased during the year now closed. The first coal dust explosion in the history of the state occurred and important laws, governing the operation of mines, were enacted.

*State Coal Mine Inspector, Helena, Mont.

The new county of Musselshell, includes the rapidly growing camps, Roundup and Klein. This county is now the third largest producer in Montana.

There has been an apparent dullness in the Montana coal trade during the year just closed due to a heavy increase of capacity and consequent overproduction. At Stockett, in Cascade County, the Great Northern Ry. Co., coal department, have installed independent haulage en-

gines for each of their new Nos. 5 and 6 mines. The Northern Pacific Ry. Co., at Red Lodge, in Carbon County, have, under their new management, increased their output from 1500 tons per day to 5000 and have even reached as high as 6000 tons. In Musselshell County, the Republic Coal Co. have increased the capacity of their No. 2 mine at Klein from 1500 tons, the record last year, to 2000, now their average daily run; this mine is now sufficiently developed to produce 3000 tons in 8 hours. In this same county, at Mine A, of the Roundup Coal Mining Company (subsidiary of the Chicago, Milwaukee & Puget Sound Ry. Co., at Roundup, the production is now 1500 tons per day. Mine B of the Davis Coal Co. is producing from 500 to 700 tons per day. Mines in the Bearcreek district are also doing considerable development in anticipation of a heavy future output.

DUST EXPLOSION

The first dust explosion in the history of the Montana coal industry occurred on Apr. 15, 1911, at the No. 2 mine of the

Republic Coal Co., Klein, Musselshell County.

The coal seam here is between 5 ft. 9 in. and 6 ft. thick, has a hard sandrock roof, and the coal is friable and frozen to both the roof and bottom. An average analysis of the coal is: Moisture 12.7 per cent.; volatile combustible, 28.7 per cent.; fixed carbon, 50.9 per cent. and ash, 7.7 per cent.

Mining is paid for on the mine-run basis and is mined by shooting off the solid, tamping being done with fine coal and slack. The mine generally is wet, although dry in places, and fuses are used in both wet and dry holes. Shooting is restricted generally, although not entirely, to the periods between shifts.

The trouble occurred in a series of five rooms, in three of which there had been no crosscuts driven. From the testimony offered, there appears to have been about 50 in. of black powder fired at practically the same time in these five rooms. In the No. 3 room one shot had been laid parallel to the face of the room and pointed toward the left-hand rib, and another on the right-hand rib, parallel with the room pillar, and directly opposite the mouth of the other hole. It appeared that both holes were over-charged and the result was that windy shots occurred.

After the explosion No. 3 room was the only one which could not be entered until some provision was made for removing the smoke and gases. The flame burned the sight-strings in front of all five rooms, and also scorched brattice cloth on the entry further out, traveling against the intake air current some 500 ft. Fortunately, the brattice between the intake and the return (a board-stopping) gave way which short-circuited the flame into the return airway where conditions for propagation were less favorable.

No one was seriously hurt, although some were scorched slightly. The property damage was practically nothing, although this cannot be credited to good judgment or management. At present all the miners use their own discretion as to the placing of their holes, the number, and the amount of powder to use. Will we, like many other mining states, require the usual disaster and consequent loss of life, to force us into the adoption of safe laws for the blasting of coal?

Labor troubles in Canada proved of considerable help to Montana operators during their usually dull season in the spring and summer. Some coal was also shipped into Canada later in the season.

ACCIDENTS IN 1911

During the year just closed there have been 13 fatal and 50 non-fatal accidents in the Montana coal mines, as follows:

TABLE OF MINE ACCIDENTS

Causes of accidents	Killed	Injured	Total
Falling roof	6	11	17
Falling coal	2	12	14
Moving cars	5	15	20
Powder burned and blasted	0	5	5
All other causes	0	7	7

OCCUPATIONS OF VICTIMS

Occupation	Killed	Injured	Total
Pick miner	12	31	43
Driver	1	9	10
All others	0	10	10

During 1911 the Montana State Legislature enacted a law providing a fund for the relief of miners injured in coal-mine accidents. The law required all operators to contribute one cent per ton of gross tonnage mined toward the support of this fund. Due to the fact that the miner, besides deriving the benefits from this fund, also retained privilege of bringing action at law for additional damages the act was declared unconstitutional by the Supreme Court of the State.

The growing sentiment in favor of some form of compensation for the dependents of those injured or killed in mine accidents, has made desirable the enactment of some such law, and it is with regret that we record its failure. From the inquiries received, applications for copies and comments made upon this law, together with words of commendation spoken at different institute meetings I have attended in Scranton, Chicago and Charleston, W. Va., I feel that this law would have come nearer filling the bill than any previous efforts along this line.

In common with all new departures, the law met with opposition from both operators and miners, which was, I think, due to a misunderstanding of its purposes. The funds were to be handled by the State Auditor, who, on proof of death or total disability, was required to make payment of \$3,000; loss of eye, arm, leg, etc., was compensated for proportionately.

EXAMINATION OF MINE OFFICIALS

Since the law requiring the examination of mine foremen and firebosses became effective (in the year of 1909) there has been issued 62 certificates. Twenty-six of these were issued without examination to parties presenting like certificates issued by competent authorities in other states. Forty-five were given service certificates without examination for having served continuously in the capacity as foreman for one year prior to the enactment of the law.

Prior to the meeting of the twelfth session (1911) of the Montana State Legislature, the operators and miners, at a joint meeting, agreed upon what laws they wished enacted. They were passed as presented and have now become a part of our statutes.

It is interesting to note that fully 20 per cent. of the coal produced in Montana during 1910 was mined on a royalty

basis. The prices varied from 5 to 25c. per ton. In some of the Western States, as for instance Colorado, large revenues are obtained from this source. During the last two years Colorado has derived \$50,000 annually from approximately 18,000 acres.

Review of Coal Trade in Ohio

The coal trade in Ohio during 1911 was not as active in many ways as that of the previous year which was the best in the history of the Buckeye State. Advance reports from the several mining districts indicate that there will be a decrease of from three and a half to four million tons in the year's production as compared to that of 1910. In some of the districts the loss was only slight and may even be turned to an increase but other districts have to report a suspension of from four to six months.

While there was a decrease in the tonnage mined, the most important feature of the coal trade was the unsatisfactory and unremunerative prices which prevailed during the greater part of the past twelve months. Prices as a whole were unsatisfactory and did not respond to the influence of weather as much as in former years. The large tonnage of 34,424,951 in 1910 was partially caused by the long lay-off in Illinois and the increased demand for lake tonnage. Taking it all in all the tonnage of about 31,000,000 in 1911 was not a bad output and if it had not been for the low prices that prevailed would have been fairly profitable to the operators.

DOMESTIC GRADES

During the year, prices did not advance above the \$1.50 mark for domestic grades excepting in rare instances. Of course, the prices in the Pomeroy Bend district were higher because of the differential in freight rates but in that district \$1.75 @ 1.85 was the highest point reached. Generally speaking the circular figure remained at about \$1.50 during the entire time but this was not well maintained during the late winter and early spring months. The year opened with prices rather firm (somewhere about the \$1.50 mark) but they remained at that point only a short time.

Under the influences of warm weather and poor steam trade, prices slumped soon after the first of the year and it was not until the middle of July that they were again pretty well maintained at the circular quotations. The stocking period produced considerable business for a short time and then followed another period of inaction during the fall months although prices did not slump to any great extent.

During the winter period weather conditions were not at all satisfactory. Up

until Christmas there was no cold weather to cause a flurry in the trade with the possible exception of one week. It has been a sort of a hit and miss proposition during the greater part of the year and will continue to be so unless conditions change to a radical degree. The Chicago market has not been such as to absorb any great amount of coal and this has had the effect of causing congestion in the domestic trade.

RETAIL BUSINESS

Retail business has not been as active as formerly. Dealers stocked up considerably early in the fall and the first run of orders was fairly satisfactory. Second purchases were not as numerous as usual and this caused the dealers to cancel their orders with the operators and jobbers. Good roads in the country districts of the state have had the effect of steadying the retail trade because farmers are enabled to haul coal at almost any time during the winter and consequently need not buy in large quantities in the fall.

The steam trade has been rather quiet. Requisitions on the part of manufacturing establishments were not as large as usual and business conditions in manufacturing circles have not been the best. There was a falling off in fuel requirements for iron and steel plants and also in fact in many other lines. However, prices on steam business have probably been more satisfactory than in any other branch of the trade and renewals of contracts have been made at about the same figures that have prevailed for some time.

In the department of railroad fuel the worst situation is seen. Railroad consumption fell off hundreds of thousands of tons from previous years. One large producing company reported a drop of over 400,000 tons in railroad fuel alone. Neither have prices for railroad fuel been satisfactory, as one large contract was taken at 85 cents, an extremely low figure.

LAKE TRADE

The lake trade was fairly active although a number of things interfered with an increased activity in that direc-

tion. The slack ore movement caused a falling off in lake shipments early in the season, which had opened auspiciously. This feature had the effect of making the boat supply rather short and later a freeze-up in the early fall caused many boats to put in for the winter sooner than usual. But on the whole the tonnage was rather satisfactory even if the prices were not the best. Congestion on the docks of the upper lake ports also interfered with a free lake movement.

In the fine-coal market peculiar conditions prevailed. The removal of demurrage charges on track storage cars permitted Ohio operators to hold up the prices to a considerable extent. The lowest price of the year was probably 30c. and the average was above that figure. The active lake season caused a large production of the small sizes.

The outlook for 1912 is not particularly promising. The one great uncertainty is the renewal of the wage scale which expires April 1, 1912. Business conditions generally are not bright and the tonnage will probably remain comparatively small.

The Ohio Coal Industry for 1911

By George Harrison*

According to advance reports from the various coal-mining districts of Ohio for the year just ended, the production in this state will be materially reduced as compared with that for the year 1910, which reached a total of 34,424,951 tons, the greatest amount ever recorded in the history of the state mining department.

While there are no official figures at hand on which to base a correct estimate, it is believed the year's tonnage will show a decrease of from 3½ to 4 million tons. Although the loss may not be so great as at present indicated, it is true that in many districts work was unusually light during the year, while in others there was a suspension amounting to from 5½ to 6 months. Several causes led to the large tonnage in 1910 that will not obtain for this year, notably the long strike in the state of Illinois and the suspensions in other districts; also, the increased demand for lake shipments.

DISTRICT OUTPUT

The tonnage of the Hocking Valley district as a whole, will fall off about 15 per cent. as compared with 1910, and that of eastern Ohio will probably show a loss of 10 per cent., or a total decrease of about 1,000,000 tons. The loss in Jackson County will be about 40 per cent.; in Meigs County, the same; in Mahoning County, 10 per cent.; Columbiana County, 20 per cent.; and in Tuscarawas County the decrease in tonnage will amount to about 200,000 tons, this being due to the enforced idleness of from 5½ to 6 months on account of the 1910-1911 strike.

The year's production will fall several million tons short of that for 1910. A substantial decrease is reported in the number of fatal accidents. The new state mining laws are in successful and satisfactory operation.

*Chief mine inspector, Columbus, Ohio.

LABOR AND WORKING TIME

No shortage of labor has been noted during the year; in fact, it will probably develop that the number of men employed was smaller than during the year 1910. While the decrease in the number of employees may not be particularly evident, the average working time per man will be seen to have been perceptibly reduced, with a consequent loss in earnings. The larger coal-producing counties will show no appreciable loss in the time worked, although the splendid record for the year 1910 will by no means be equaled. Other counties will show the working time as being about two-thirds and in some cases only one-half of that for the previous year, while in the districts of smallest production, the working time will scarcely reach half of that for 1910.

Prices for Ohio coal during the year were not particularly high and were subject to considerable fluctuation. A shortage of cars was reported on the Toledo & Ohio Central Ry. in the Hocking Valley. This is, however, usually the case during the latter months of the year when there is an increased demand for fuel. The lake trade for the year, it is believed, will not compare favorably with that for 1910, when the greatest tonnage ever shipped to the Lakes was recorded.

ACCIDENTS

The number of fatal accidents in Ohio will show a great decrease as compared with the preceding year. In 1910, 161 accidents were recorded, while up until Dec. 15, only 107 accidents have been reported for this year. Of this number 81 were due to falls of roofs; 10 to falls of coal; 7 to mine cars; and 3 to electricity. Particularly gratifying is the notable decrease in the number of persons killed by mine cars, from 19 in 1910 to 7 in 1911; also the decrease from 97 to 81 in the number killed by falls of roofs, and from 7 to 3 in the number killed by electric shock. So far no fatal accidents have been reported from the use of mining machines since the new law has required that the machines shall be properly shielded and has imposed a fine as penalty for removing such shields.

Belmont County reported the greatest number of fatal accidents, 36 in all, of which 32 were due to falls of roof; Jefferson County reported 21, of which 16 were due to the same cause. In these two counties the No. 8 seam of coal is

worked. This seam has a dangerous top, and in many instances the miners become careless and neglect to take it down; the result is seen in the large number of deaths from this cause. Guernsey County reported 16 killed, 10 deaths being due to falls of roofs. Three other counties each reported only two fatal accidents. Seven counties had but one fatality apiece, and thirteen counties reported no accidents at all which resulted fatally.

VIOLATIONS OF MINING LAWS

The number of violations of the mining laws shows a decrease from 52 cases in 1910 to 37 in 1911. This latter number includes two prosecutions which were not reported to the state mine inspector's office last year until after the year's record had been closed; it also covers one case carried to a higher court and disposed of during the year. So far as it is possible

to learn, all the prosecutions instituted both by the state mining department and employers of labor, have resulted in convictions. These results seem particularly favorable in view of the fact that the new code did not go into effect until June, 1910, and it required some considerable time for all persons connected with the mining industry to familiarize themselves with its provisions and the penalties for non-compliance. On the whole, operators and miners alike show a commendable disposition to respect the laws.

PROSECUTIONS WERE UNDERTAKEN

The fines for violations of the state mining law amounted to \$400 and prosecutions were undertaken for the following causes: Burning impure oil, 10; employment of a minor, 1; violation of the breakthrough law, 5; not properly shielding a mining machine, 2; crossing a danger signal placed by a fireboss, 2;

entering a mine before it was examined by a fireboss, 2; entering a mine generating firedamp, with an open light before mine was examined by a fireboss, 1; failure to supply sufficient ventilation, 1; failure to provide safety catches on a mine cage, 1; using acetylene lamps, 2; failure to supply proper timber to miners, 2; riding on haulage trips, 6; and selling inferior oil, 1.

OUTLOOK FOR YEAR 1912 NOT PROMISING

The outlook for the year 1912 is not considered to be particularly promising, and it is not expected that any material improvement of conditions will be shown over the present year. One reason for this is the expiring wage contract, which will have to be considered and renewed. Nevertheless there seems to be no reason why 1912 should not be a reasonably prosperous year for both employer and employee.

The Coal Industry of Oklahoma, 1911

By Ed. Boyle*

Oklahoma's coal deposits are extensive, but the state has labored for many years under serious difficulties in connection with the production of her natural resources. The coal-mining industry has been retarded for a number of reasons, and the first among these is the fact that practically all the mines of the state are worked under lease from the Federal Government. For several years past the Interior department has refused to lease any coal land in the belt segregated by the U. S. Government, and consequently there have been no new developments in the Oklahoma field, except such as have taken place on an extremely small scale, where coal has been discovered on the lands allotted to the Indians. These lands have, in some cases, been leased by individuals or small companies, and, in the aggregate, have added materially to the total output.

MINING COST AND COMPETITION

The coal in Oklahoma outcrops on the prairies with a pitch of from 5 to 45 deg. The seams are usually worked by slopes in the vein and where development was started a number of years ago these slopes have, in many instances, now reached such a depth that mining has become much more expensive than it was when carried on closer to the surface. Along with this condition, coal production has been retarded by the competition of cheaper fuels, such as oil and natural gas, of which there seem to be inexhaustible supplies in this state. The only system by which Oklahoma coal can be put on the market at a price to meet the competition from adjoining coal fields and other fuel supplies, involves sinking shafts to reach the vein which is being worked at present. These shafts would,

Suspension of work, competition and other influences have combined to restrict the year's production in Oklahoma to less than half what it normally should be in view of existing developments. The coke industry is at a standstill. Accidents are gratifyingly few.

*Chief mine inspector, State of Oklahoma, McAlester, Okla.

in many instances, have to run down to a depth of 500 or 600 ft., and, under present conditions, the coal operators do not feel disposed to undertake any measures which will require so large an outlay of money or capital as would thus be involved.

COKE INDUSTRY

There are a number of seams of coal in Oklahoma, varying in thickness from 24 to 72 in., which are of exceedingly good quality. Some of this coal makes an excellent grade of coke and a large number of ovens have been built in this field. At one time large quantities of coke were supplied to the smelters of Mexico, but this trade has been lost on account of the prohibitive duty, since imposed by the Mexican government. It has been found unprofitable here to attempt to manufacture coke in competition with the Colorado field for furnishing this grade of fuel to smelters throughout the West, and, therefore, the

coke ovens of Oklahoma now stand idle almost without exception.

The total coal production of Oklahoma for the year 1911 will reach approximately 2,800,000 tons, which is an extremely small output for this field. If there was a market for the coal, the present openings and development should be producing, with steady work, 6,000,000 tons per year, but it seems that during a suspension of work in 1910, the operators lost most of their contracts to competitive fields and have been unable to regain them up to this time.

WASTEFUL METHODS

The system of mining in general use in Oklahoma is criminally wasteful. Leases have usually been secured with but one object in view, which is that of getting out the cheapest coal and leaving the balance to go to waste. It is now time that the people should become aroused over this unwarranted waste and demand mining methods and conditions which will conserve the resources of the state.

Mining conditions in this state differ from those found elsewhere, chiefly by virtue of the peculiar character of the roof. This contains a large proportion of limestone, which is easily slacked by the air current and requires great care and an unusual amount of timber to keep it secure. Nearly all the mines of this field are generating large quantities of gas and have to contend with a particularly combustible form of dust, but thanks to competent management and supervision and a strict enforcement of the mining laws, there has been a great decrease in the number of fatal accidents, which is especially gratifying when compared with the number reported in other fields operating under similar conditions.

Bituminous Mines, Pennsylvania, 1911

There has not been a large amount of development in the bituminous regions during the past year owing to the small profits in recent mining. The great advances of the past few years have been in the center of the state, where large developments have been made in Indiana and Armstrong Counties.

The Buffalo, Rochester and Pittsburgh Railway has not been slow to realize that the depletion of the resources in Jefferson and Clearfield Counties must be met, and more than met by developments elsewhere, in order to provide traffic for the road on which they are continuing to make large and expensive improvements. These developments, their allied interests have sought to make in Indiana, where the same beds which they have mined in the past, to wit, the Lower and Upper Freeports are situated so far below the water-level, that the area they cover is almost co-terminus with the boundaries of the County. These coals are situated about 75 ft. apart, and are therefore both workable, the extraction of the one not interfering with the later extraction of the other.

This year large developments have been made at the Lucerne plant including the placing of steam turbine generators, and the erection of a large steel tippie, capable of handling several thousand tons a day. The mines are in the Upper Freeport, as are those also at Ernest, but at both mines it is the intention to sink to the lower bed, so that a large tonnage will be available. A branch has been built to Jacksonville, and a big mine is under development at this point.

ARMSTRONG COUNTY DEVELOPMENT

The receivership of the Buffalo & Susquehanna Coal and Coke Co., has prevented any important developments, and the main interest has been centered around the abandonment of a well-equipped shaft at Onondaga near Big Run. The Allegheny River Mining Co., has profited by the extension of the Pittsburgh Shawmut & Northern R.R. from the village of Knoxdale in Jefferson County to the Allegheny River. This extension has a low gradient for a road which crosses several summits and it is well fitted for handling a large tonnage. The Allegheny River Mining Co., an allied corporation, has two mines locally known as Oakland and Tidal Mines. The latter is ready for operation and has been renamed Chickasaw. The Oakland operation will also soon be shipping coal.

The extension of the "Shawmut" line down to Nicholson Run below Kittanning, has been largely graded and can easily be prepared for traffic. Several mines have been opened and much work

Editorial Correspondence

The operators of the northern part of the bituminous coal field are being driven southward by the rapid depletion of lands in Mercer, Tioga, Elk, Jefferson and Clarion counties, and have invaded Indiana and Armstrong.

Improved extraction methods are not spreading. New mining law subjected to much criticism.

done on Limestone, Brunner and Nicholson Runs. It is understood that what little work remains to be done to complete the extension to Nicholson Run will be completed, to the end that a large acreage of coal lands lying adjacent to the proposed route, and owned by the Allegheny River Mining Company may be developed. It is proposed to erect a large central power station at Glade Run for the use of these mines. A line of road has been surveyed toward Butler, and if this line is completed a large undeveloped part of Butler County may be open for operation.

ALONG THE ALLEGHENY RIVER

Travellers passing along the Allegheny Valley by the Pennsylvania R.R., formerly the Buffalo & Allegheny Valley Ry., have long wondered that the left bank of the stream was well developed, while the right bank showed few houses and no mines. The work of the "Shawmut" interests give assurance that the right bank will now be well occupied and even more prosperous than the other, because the mines will be in the hands of larger and more adequate financial concerns, having a steady market for their coal.

From Parkers Landing southward, the coal measures are continuous, yet to the point (Kiskiminetas), where the West Penn R.R. crosses the Allegheny River, no shipping mines were formerly to be seen, though just over the ridge near Red Bank an exception might be found in the mines of the Great Lakes Coal Company at Caylor, these mines being tributary to the Allegheny and Western R.R., an extension of the Pittsburgh, Bessemer & Lake Erie R.R.

CHANGE OF WORKING SEAM

The bituminous area under operation will soon be measurably constricted un-

less coal is discovered in the Kittanning measures over a large area where it is now believed to be of little value. But little coal remains in Elk County. The two principal holders of coal in that county, the Shawmut Mining Company and affiliates, and the Northwestern Mining & Exchange Company, have both made their more recent extensions in other counties, owing to the restrictions in their home county. Clearfield County may hold its own for a while, and perhaps even increase, but this increase will largely come in the lower measures especially in the Lower Kittanning Bed in which—and in a lower seam—nearly all the operators along the Moshannon and its branches are now working.

The Lower Freeport Bed, the stand-by seam of Jefferson County, and an important seam in Elk, Clearfield, Clarion and Armstrong is marked by extensive "wants," sometimes reaching a width of two miles. These wants which are erroneously called faults, and which are the channel beds of streams existent in the carboniferous period, have reduced the available area of Freeport coal considerably. As the beds lie high on the hills, modern erosion has combined with ancient to make the area to be mined limited. In Elk County, no Freeport coal is being mined, and in Clarion County but few mines are working it. In Jefferson County the depletion is very rapid and exhaustion is drawing near. In Armstrong and Butler Counties a large amount still remains.

The ratification of the plan by which the Pennsylvania Coal and Coke company was reorganized promises a new life for that company in Cambria and Clearfield counties. The slack watering of the Allegheny River beyond the mouth of the Mahoning, as recommended by Major H. C. Newcomer, if completed, will enable coal to be loaded in barges and shipped south from many mines, which have so far been tributary entirely to the Buffalo market. This overstocked mart should feel this relief, should the much desired plan ever advance beyond the Newcomer report.

METHODS OF COAL EXTRACTION

Though as far as the United States is concerned, careful and conservative methods of coal extraction originated in the Connellsville region of Pennsylvania, yet it cannot be said that Pennsylvania is leading other states in this matter. Other sections seem prepared to let Connellsville have proud preeminence, and mining is generally by the primitive advancing room-and-pillar methods providing a great number of short, unreliable lines of roof fracture. There does

not seem any disposition to improve methods except in the leaving of larger pillars and in more speedy pillaring. In the Freeport beds there seems to be no great loss apparent from such primitive methods, because the roof breaks easily and the cover is light. But in the Lower Kittanning mines, the roof is quite strong, and the cover heavier. The coal and development lost in this bed is often large, and in Cambria county an attempt has been made to avoid this by strengthening the weak spots which, unfortunately, may be expected to occur in headings on that side where the rooms are turned off. This is effected by driving rooms with long distances between centers, in fact double the ordinary distance, other rooms being started from the cross cuts out of these first rooms as soon as a sufficient pillar, of about 100 feet, has been left to support the heading. Thus every room approaching the heading serves as the roadway of two other rooms.

FIRST COSTS OF COMPLETE PLANTS

Operators have, for many years, been of the opinion that as coal was cheap there was but little economy in saving steam by any of the approved methods recommended where coal costs \$5 per ton delivered. Till recently all economies have been directed solely to saving labor by the use of coal-feeding devices at the furnaces with the commendable idea of reducing labor costs and making steam with inferior coal. Some

still argue volubly for the belief that coal which is a drug on the market, as is slack most of the year, should not be saved at the expense of any outlay on equipment.

For this cause, uncovered pipe lines, leaky furnaces and bad pipe joints remain unregarded at small plants. Even in larger plants, noncondensing and reciprocating engines still hold their own. But there is gradually working the idea that it is cheaper to conserve fuel not for its own sake, however cheap it may be, but because the conservation saves labor in firing, makes a better plant, and above all one that costs no more. It is an undesirable practice to increase boilers and engines in size and number of units above the call of prudent necessity, when with economy in using steam by means of superheaters, feed water heaters, turbines, condensers, electrical high pressure transmission, and careful upkeep of details the plant could be kept down to normal size. It is being realized that a good plant burns less and poorer fuel, gives a steadier power delivery, saves labor the year around and costs at the first outlay but little if any more because the price of economical devices is offset by the reduction in size and in number of the large units. These factors, whilst they do not make great headway at the older plants are receiving more consideration where new mines are opened. The older mines

must eventually be reequipped and it is not infrequent to find the dates of power development marked plainly by the new mechanical designs in the power house.

THE NEW MINE LAW

The new Pennsylvania Bituminous Mine Law was approved June 9 of this year. It has occasioned no little unfavorable comment. Before it was finally framed a vigorous protest was made to all the new provisions, but at length the law was enacted and the whole Code fills 136 pages. It is one of the most complete mining codes on record. Its principal fault is its obscurity. There is evidence of the stress of conflict out of which it emerged, but it is probable that the conflict alone is not responsible for its illogical arrangement. Article XI is entirely new. It deals with the installation of electricity in the mines at length, devoting 24 pages to the subject. The uncertainty of the meaning of the law made some operators make the declaration that they would remove their firebosses from the mines. This was perhaps not stated in real earnestness. But the Chief of the Department of Mines wrote a strong letter to them urging the retention of all the firebosses employed. It remains to be seen whether a code specifying exactly what shall be or shall not be done is as good as one leaving larger power of control in the hands of the inspectors.

The Pittsburg District in 1911

By B. E. V. Luty*

The financial results of the year 1911 in the Pittsburg district coal trade were unsatisfactory. Demand was lighter than in the previous year, but with ample car supply and increased capacity the production was only a few per cent. less than in the previous year, with the result that prices suffered throughout the year.

In 1910 the \$1.15 price for mine-run was maintained practically throughout the year, but there was an advance to \$1.20@1.25 after the wage increase accorded for the biennial period beginning Apr. 1. In 1911, on the other hand, the \$1.15 price scarcely prevailed at any time, and was frequently shaded by as much as 10c. per ton on important contracts, while occasionally odd lots forced on the market brought less than a dollar. Large operators were slightly helped in their year's average, however, by the existence of long-term scale contracts, based on the mining rate. These, while on the whole calling for low rates gave a fixed price equal to that of the last nine

months of 1910, and above that of the first three months of that year. The average realized price on all the coal mined in the district probably fell between 5c. and 10c. below the average of 1910, which with a slight decrease in the total tonnage made the year an unsatisfactory one.

Definite steps were undertaken in the year to improve the position of the Pittsburg district in the lake coal trade, the case of the 88c. rate from the Pittsburg district to the lakes being brought forcibly to the attention of the Interstate Commerce Commission. The contention was based on a comparison of ton-mile rates with West Virginia and other districts having much longer hauls but only slightly greater total rates to the lakes. A reduction to 50c. was asked, and the Commission is expected to order some redress, though hardly as great as asked.

Early in June the United States Steel Corporation purchased the entire coke operations and coking coal holdings of the

Pittsburg Coal Co., involving about 7000 acres and 956 ovens, paying a flat price of \$1450 per acre. Making allowance for the value of ovens and other improvements the price was computed at about \$1,000 per acre for the coal land alone. At the same time the steel corporation purchased the coking coal of the Monongahela River Consolidated Coal & Coke Co. paying \$850 an acre for about 9000 acres of undeveloped land. In each case payment was made by bonds on the properties, guaranteed by the steel corporation. These operations put the Pittsburg Coal Co. in position to retire some of its debt, at the same time undertaking to absorb the outstanding stock of the River Coal Co., in which it had previously owned only a controlling interest. The intention is probably to ultimately absorb the properties and divert much if not all of the output to the rail instead of the river trade.

Production of coke in the Connellsville and lower Connellsville region was about 16,000,000 net tons, a decrease of

*Bessemer Bldg., Pittsburg, Penn.

about 15 per cent. from the preceding year and of 20 per cent. from the record year 1906. This was partly due to decreased consumptive demand, due to lessened output of pig iron, but it was also due in part to development of other fields, and in part by reason of the adoption of byproduct ovens. The Connellsville region shows no indication of ever adopting byproduct practice, though it has rapidly been making improvements in recent years by the adoption of the rectangular push oven, involving a slight decrease in cost of operation.

Coke prices in 1911 were altogether

unsatisfactory. The market price for spot furnace coke occasionally ranged above \$1.50 at ovens, but as frequently below, and an average of monthly quotations indicates an average for the year of \$1.50. Contracts made for the year, chiefly in December, 1910, were mostly at from \$1.55 to \$1.65, a number of scale contracts (coke to be settled monthly at a stated fraction of the prevailing price of pig iron) being made with minima of about \$1.60, the minimum prevailing throughout the year. Contracts for 1910 had been made quite largely dur-

ing the boom in the closing months of 1909, and showed a much higher average.

The monthly prices for Connellsville coke during the year just closed were as follows:

PRICES OF CONNELLSVILLE COKE.

	Furnace.	Foundry.
January	\$2.60	\$3.05
February	2.25	2.75
March	2.00	2.60
April	1.80	2.40
May	1.70	2.25
June	1.65	2.20
July	1.65	2.15
August	1.65	2.15
September	1.60	2.15
October	1.55	2.10
November	1.45	2.00
December	1.50	2.00

Coal and Lignite in Texas

By William B. Phillips *

The production of coal in Texas will be about the same as last year and may be taken at a million tons, an equal amount of lignite also being produced.

The coal producing counties are: Erath, Jack, Palo, Pinto, Parker, Wise and Young in the North Central coal field and Maverick and Webb in the Rio Grande coal field. The north central coal field is of the Carboniferous and the Rio Grande coal field of the Upper Cretaceous or Tertiary period.

Most of the coal mined in Texas is for railroad purposes, not much of it being sold for domestic use. The total coal area is probably about 13,000 sq. miles, with an original supply of 8 billion tons. As a rule the seams of coal are comparatively thin, less than 30 in., and the usual ash content is 16 per cent., with sulphur 2 per cent. The heating power of these coals is, on the average, 11,000 B.t.u. and the weight per cu.ft. 87.5 pounds.

LIGNITE

The production of lignite will be about

one million tons, or nearly the same as last year. Workable beds of lignite occur in 43 counties and the total area is about 60,000 sq. miles, or one-half of the total known lignite area in the United States. The deposits run in thickness up to more than 15 ft., and every variety of lignite is represented.

PRODUCTION OF GAS FROM LIGNITE

There is now much interest being taken in the production of gas from lignite, especially for power purposes. There are 56 gas producers in Texas and 47 were in active operation during the year; some of them, however, only intermittently. There are 23 establishments making producer gas from lignite and the consumption of lignite for such purposes is about 80,000 tons a year.

In this state 11,490 engine horse power is derived from lignite gas. Most of these installations are of small size, as two establishments alone represent

7,700 horse-power. Producer gas made from lignite is in successful competition with natural gas. No briquets are made in the state and there seems to be but little interest in this matter. Some of the Texas lignites make an excellent briquet without artificial binder.

A CENTRAL POWER STATION

Certain interests have considered the practicability of making producer gas from lignite at some central station, near regular supplies of this fuel, and transforming the power into electric current for distribution to cities and towns. In this direction there might be opportunity for a considerable business, as the price of lignite, at the mines, is about 90c. a ton. From a ton of good lignite there can be produced from 60,000 to 70,000 cu.ft. of producer gas, with a heating power of from 125 to 150 B.t.u., per cubic foot. As byproducts, there would be tar and ammoniacal liquor, the former yielding light oils and paraffin, the latter yielding sulphate of ammonia.

*Director Bureau Economic Geology and Technology, Univ. of Texas.

Utah Statistics for 1911

By J. E. PETTIT*

The production of coal for this state for 1911 is 2,501,472 short tons, a decrease of 24,622 tons when compared with production for 1910. The reason for decrease is attributed first to the open winter of last year and the falling off of orders during the first three months of the year. Later during the fall a continual shortage of railroad cars has been experienced.

The production of the hydrocarbon mines is 37,050 tons, an increase of 9501 tons over 1910. The production of coke was 212,368 tons, an increase of 66,304

over 1910, attributed to the fact that the Utah Fuel Co. secured some of their old contracts from the Amalgamated Copper Co. that were rescinded two years ago.

The amount of explosives used was: Black powder, 398,285 lb.; giant powder, 301,792 lb., which includes Monobel, Bental No. 2 and other permissible powders, a total of 700,067 lb., or one pound of powder for every 3.57 tons of coal mined. This shows a decrease in the amount of black powder used during the year, and a corresponding increase in the permissible powders.

NEARLY 4000 MEN EMPLOYED

The total number of men employed inside and outside in both the hydrocarbon and coal mines and coking plants was

3798, an increase of 499 over the preceding year. The average number of days worked at the various mines was 252, and the average amount of coal produced per man was 712 tons.

There were 84 accidents in and around the coal and hydrocarbon mines, of which 16 were fatal, 18 serious and 50 nonserious. There was one fatal accident occurred outside of the mine. Seven wives were left widows and 21 children fatherless. The per cent. of fatal accidents for the year 1911, both inside and outside, was 4.21 per 1000.

The amount of coal mined for each life lost was 156,342. The causes of the fatal accidents were: Falls of rock, 4; falls of coal, 8; runaway cars, 2; boiler explosion, 1; loaded trip of cars, 1.

*State coal mine inspector, 501 Dooly Block, Salt Lake City, Utah.

Virginia Coal Output increasing

Coal mining in Virginia has made important increases within the past generation. Although not a great coal State Virginia produced over six and a half million tons in 1910. The State is one of the earliest producers, the figures of the United States Geological Survey showing a small output as far back as 1822. In 1850 the production was 310,000 tons and at that time only two States stood above Virginia. While other States were forging ahead the increase in Virginia was slow until about 1895, when 1,368,324 tons were produced. In 1900 the production was 2,393,754 tons; in 1905 it was 4,275,271 tons; and in 1910 it was 6,507,997 short tons, the greatest in the history of the State.

Washington State Coal Statistics

The table shown below gives the detailed statistics of the coal industry in Washington for the fiscal year ending June 30, 1911:

Coal in West Virginia

With the close of the present year and the coming of a new one the coal men of West Virginia find conditions greatly improved over those of a year ago. In fact, it was only at the close of the year that conditions changed and brought hope for better things. The spurt in prices, of course, is the real blessing the holiday month brought, and even something a little better is predicted for the months of January and February.

For the calendar year the output has been above that of any previous year, but it is believed that statistics will show that the cost of production will be greater than previous years, while the price received for coal has been exceedingly low. These estimates are based on facts as found by some coal men in their own operations and are believed to hold generally throughout the state. With the increase in the price of smokeless and the expected increase in other coals, the new year presents a cheerful outlook as compared with the beginning of the one now closing.

Imports of Coal in 1911

The total imports of coal for the first ten months of the year just closed amounted to 998,795 tons, as compared with 1,628,111 tons for the same period in 1910. The total estimated imports for the current year will be about 1,198,500 tons as compared with 1,991,943 tons for 1910. By far the largest percentage of this coal comes from Canada, only about one-tenth being imported from other countries, of which Australia and Tasmania are the leaders. The imports are confined almost entirely to bituminous coal, no anthracite being imported in 1910 and only 42 tons during the first ten months of 1911.

Because of labor troubles in the British Columbia field, the figures for 1911 are not representative of the normal condition of this trade. Canada is by far the largest exporter into the United States and the shut-down of the British Columbia mines during two-thirds of the year, has made an appreciable difference in these figures.

COAL STATISTICS FOR THE STATE OF WASHINGTON, FISCAL YEAR ENDING JUNE 30, 1911

Compiled by D. C. Botting, State Inspector of Coal Mines, Seattle, Wash.

Name of Company	Name of Mine	Town	Tons of Coal Shipped	Sold to Employees	Used for Power	Total Coal Production	Days Operated	Inside Employees	Outside Employees
KING COUNTY									
Carbon Coal and Clay Co.	Carbon	Boyerne	13,058	207	1,416	14,681	128	28	31
Carbon Coal and Clay Co.	Daly	Boyerne	15,062	.....	.....	15,062	150	34	1
Central Coal Co.	Grand Ridge	Issaquah	17,472	614	1,242	19,328	114	29	19
Denny Renton C. and C. Co.	Kummer	Kummer	.....	59	1,630	1,689	119	2	1
Denny Renton C. and C. Co.	Renton	Renton	.....	.....	12,825	12,825	150	20	2
Denny Renton C. and C. Co.	Taylor	Taylor	.....	1,102	41,679	42,781	148	60	8
Fleet Coal Co.	Fleet	Cumberland	1,400	.....	.....	1,400	22	2	1
May Creek Coal Co.	May Creek	Coalfield	550	252	675	1,477	140	8	7
Northwestern Imp. Co.	Ravensdale	Ravensdale	85,670	1,078	5,712	92,460	127	223	58
North Coast Colliery Co.	Danville	Ravensdale	.....	.....	.....	.....	.....	.....	14
Occidental Coking Coal Co.	No. 1	Occidental	5,216	69	235	5,520	60	45	13
Pacific Coast Coal Co.	Gem	Franklin	19,965	319	2,507	22,791	98	70	15
Pacific Coast Coal Co.	B.	Black Diamond	1,616	.....	51	1,667	171	16	6
Pacific Coast Coal Co.	No. 11	Black Diamond	114,014	.....	10,055	124,069	129	240	91
Pacific Coast Coal Co.	No. 12	Black Diamond	442	.....	60	502	163	14	13
Pacific Coast Coal Co.	No. 14	Black Diamond	61,679	1,633	2,992	66,304	135	145	29
Pacific Coast Coal Co.	New Castle	New Castle	111,895	419	5,821	118,135	132	128	83
Rose Marshall Coal Co.	Rose Marshall	Cumberland	9,638	79	505	10,212	126	32	19
Superior Coal and Imp. Co.	Superior	Issaquah	2,443	107	122	2,672	69	13	9
The Independent C. and C. Co.	.....	.....	.....	.....	.....	.....	.....	.....	2
Seattle Electric Co.	Renton	Sec. 33 Twp. 21 R 7 E. Renton	70,218	2,305	5,456	77,979	134	234	51
KITITAS COUNTY									
Busy Bee Min. and Div. Co.	Busy Bee	Beakman	9,500	304	110	9,914	188	30	13
Northwest Coal Co.	Lakeside	.....	1,454	.....	.....	1,454	61	10	4
Northwestern Imp. Co.	Cle Elum	Cle Elum	91,471	1,868	5,248	98,587	81	328	39
Northwestern Imp. Co.	No. 2, 6 and Dip.	Roslyn	114,608	3,902	8,015	126,525	74	429	92
Northwestern Imp. Co.	No. 3	Roslyn	76,254	234	1,331	77,819	76	285	13
Northwestern Imp. Co.	No. 5	Roslyn	71,997	151	1,495	73,643	78	211	20
Northwestern Imp. Co.	No. 7	Cle Elum	79,554	287	1,813	81,654	78	293	15
Roslyn Cascade Coal Co.	Patrick McKay	Ronald	28,318	138	188	28,644	73	55	31
Roslyn Fuel Coal Co.	Buckman Slope 1	Roslyn	119,015	520	3,067	122,602	144	181	45
Roslyn Fuel Coal Co.	Beekman 2	Beekman	645	97	.....	742	...	2	13
LEWIS COUNTY									
East Creek Coal Co.	No. 3	Ladd	30,745	69	904	31,718	129	64	15
Mendota Coal and Coke Co.	No. 1	Mendota	22,988	79	714	23,781	67	53	11
Superior Coal Co.	No. 2	Cheholis	1,181	2,228	336	3,745	138	7	6
Wilson Coal Co.	Wilson	Kopiah	19,603	104	1,455	21,162	114	70	27
Carbon Hill Coal Co.	Carbon	Carbonado	161,373	756	10,612	172,741	149	368	216
Coast Coal Co.	7-10-11-12	Spiketon	26,316	161	635	27,112	153	143	84
Northwestern Imp. Co.	Melmont	Melmont	36,172	379	1,448	37,999	142	76	21
Pacific Coast Coal Co.	Burnett	Burnett	63,145	615	2,800	66,560	121	204	55
Tacoma Smelting Co.	Fairfax	Fairfax	1,449	156	119	16,178	149	39	33
Wilkesan Coal and Coke Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Tacoma Coal Mine Co.	Gale Creek	Wilkesan	27,145	162	1,810	46,979	91	130	105
.....	.....	.....	12,797	218	2,072	15,087	131	44	13
THURSTON COUNTY									
Washington Union Coal Co.	Hannaford	Tono	19,761	110	463	20,334	79	38	18
WHATCOM COUNTY									
Whatcom Co. Coal Co.	Blue Canyon	Blue Canyon	3,345	.....	48	3,393	141	15	4
			2,549,174	20,781	137,666	1,739,927	4,772	4,418	1,366

NOTE—21,688 tons of coke were produced in Pierce county.

West Virginia during 1911

Special Correspondence

West Virginia has at least made progress in three directions during the past calendar year—in production, in price of coal and in the methods of mining with a view to the greater safety of men and property and a reduction of costs. In other words, the practical side of mining has been sought and practiced, where for years the mining department of the state has struggled in vain to change policies.

PRODUCTION AND NEW DEVELOPMENTS

The new development during the year was, briefly, the establishment of 18 new coal plants, the construction of 55 new power plants, the erection of 25 mine fans, 15 tipples and about 25 additional openings to old mines. This, however, does not mean that the above number of mines have been added to the number that existed on Jan. 1, 1911. On the other hand, a number of mine openings have been closed. In fact, a much greater number were closed than were opened, so that the number of mines, or openings, is much less at the end of the calendar year of 1911 than at the beginning.

The official statistics in the office of the Department of Mines show the total net ton output for the calendar year of 1910 was 60,090,239. While it is not possible, at this time, to get the exact tonnage for the calendar year 1911, the department of mines has sufficient information to form the belief that it will be at least 60,500,000 net tons, or an increase over 1910 of something like a half million tons. The fiscal year in the mine department in this state ends on June 30, and therefore to secure the calendar-year statistics it is necessary to go into the statistics of two years, and to the fact that the mine year does not end with the calendar year is doubtless due the many conflicting statements relative to the statistics in this state.

EARLY STATISTICS

The first statistics on mining in West Virginia began with the year 1863, when the output was 444,648 net tons. Since that time there has been an increase in output every year, with the exception of the years 1876, 1881, 1895, while the output in two years is given as the same—it not being possible to secure the exact tonnage. The biggest advance, however, came in 1910, when the output increased from something below 50 million to a little over 60 million net tons.

The output for the first six months in 1911 was not encouraging, when compared with the last six months in 1910, as a decrease of a little over three million tons was found to exist, but the output the last six months has been so great that the decrease was wiped out and an increase shown.

The production of the West Virginia mines for 1911 will probably exceed 60 million short tons, the largest output the state has known. Conditions generally have been satisfactory.

PRICE IMPROVEMENT

One of the greatest improvements in conditions is the increase in price. Although small, and most of it due to the increase during the last month or two, it indicates a better outlook for 1912. The authority for this statement is the present head of the mining department, John Laing. Speaking about output and price, he said:

I think the output for 1911 will reach 54 million gross tons, provided the Christmas holidays do not make a greater deduction than usual. The price of coal, f.o.b. cars at the mines, from such information as we are able to gather will be 96c. a short ton, on the mine-run basis, which is about one cent better than for 1910.

While the production of coal in this state is rapidly increasing the prices at the mine stand about the same, which shows conclusively that the quality of West Virginia coal is superior to that of our competing states which are more favored in the question of freight rates. The difference in freight rates for West Virginia coal, you might say, is added to the cost of coal to the consumer, or, in other words, our competing states receive practically the same price that West Virginia receives. I believe the price of coal to West Virginia operators has gone as low as it will ever go and I can see no reason why it should not gradually increase until it reaches what we might call a fair return for our product. The operators of West Virginia are not receiving the same interest on their investment as the operators of other industries on theirs and at the same time the coal business is responsible for other industries in West Virginia.

The production of coke has decreased about 50 per cent. during 1911, and will not greatly exceed two million tons. The operators find it almost impossible to manufacture coke at the present market price, especially while the price of West Virginia coal is near normal. The ovens are gradually being closed all over the state. The price of coke this year has been about \$1.80, net, at the mines, against \$1.83 in 1910. It is the belief of Mr. Laing that if all the ovens in the state were closed, the production of coal would not show any considerable falling off.

The state has been free of labor troubles during the past year. Several of the mines had trouble with their men, but the difficulties lasted but a few days. In fact, these occurred at only four or five mines. The statistics show that about 72,000 men were employed in and around the mines, exclusive of superintendents, mine foremen, managers, store and office forces.

ACCIDENTS

Unless there should be additions for the closing days of December, of which the mine department has received no information, the total fatal accidents for the year will be 325—a slight decrease over 1910. The nonfatal accidents totalled 770—also a slight decrease over 1910. The state had two explosions during the year. At the Ott mine, of the Davis Coal & Coke Co., at Thomas, 20 lives were lost, due to a gas and dust explosion. At the Bottom Coal & Coke Co.'s mine, at Vivian, 18 lives were lost, caused by men entering an abandoned section with open lights. In 1910 there was but one, causing the death of three men. Speaking of the accidents in mines, Chief Inspector Laing said:

I regret that reports received by this department show that 80 per cent. of the fatal accidents were caused by carelessness on the part of workmen themselves by going in dangerous places after being warned not to do so.

One thing that entered into, and probably made possible the increase in output in 1911, was the supply of cars. There was, in fact, no serious shortage of cars at any time during the year—a condition that has never before prevailed in West Virginia, in the opinion of some of the oldest miners. The railroads have made great improvements in equipment and facilities for handling coal, and their interest in trying to handle the output has received cooperation from the operators, and instead of being at "outs," the operators and railroads have been working in harmony and friction was little known.

One of the greatest changes in the industry has been in requiring every mine foreman and fireboss to hold a certificate obtained at an examination held under the supervision of the chief of the Department of Mines. These examinations have been held during the year, and beginning with Jan. 1 no mine was permitted to be operated that did not employ a mine foreman and fireboss (if one was necessary) that did not hold a certificate. The department has also laid down other important rules in mining, all leading to the one thing—efficiency of the persons holding responsible positions—and the operators have agreed to cooperate with the department in carrying out the instructions.

Coal and Coke Exports in 1911

According to the Bureau of Statistics of the Department of Commerce and Labor, the coal exports from the United States have trebled in value in the last dozen years. The total value of the coal exported in the year of 1911 is in round numbers, 80 million dollars, as compared with 65 million for 1910.

The United States now ranks third among the coal exporting countries of the world, being exceeded by the United Kingdom and Germany, who exported in 1910, 179 million and 104 million dollars worth of coal respectively, while the United States exported only 45 million, exclusive of bunker coal. However, the growth of the United States export trade is increasing much more rapidly than that of any other country, as may be shown by comparing the export figures of 1900 and 1910. During this period the export coal trade of the United States has increased practically 100 per cent., Germany 60 per cent., while that of the United Kingdom has suffered a slight decrease.

The principal destination of our export coal is to Canada, as shown by the figures for the first ten months of 1911, during which period our total exports of bituminous were valued at \$28,732,888, of which \$21,510,604 was shipped to Canada. Because of the strike of about eight months duration in the British Columbia fields our exports to this trade have been abnormal during this period. The next four important export markets are Cuba, Mexico and Panama, each taking between one and two million dollars worth annually.

As compared with our other exports, coal now ranks seventh in importance, being exceeded by cotton, iron and steel, meat and dairy products, copper, wood manufactures, wheat and flour.

QUANTITIES OF EXPORTS

The total exports of anthracite for the first ten months of 1911 were 3,016,127 tons, as compared with 2,483,413 tons for the same period last year, showing an increase of approximately one-fifth. This trade is almost entirely with Canada, only a very small portion going to other countries. An approximate estimate of the total anthracite exports for the year of 1911 places this tonnage at about 3,620,000 long tons, as compared with 3,021,627 tons for the year of 1910, showing an increase of nearly one-third in the export anthracite trade.

The total exports of bituminous coal for the first ten months of the year just closed were 11,643,931 tons, as compared with 9,105,787 tons for the same period

Editorial Correspondence

The export tonnage of the United States is increasing rapidly as compared with that of other countries. During the past 12 years this trade has trebled in value and for 1911 will amount to more than 80 million dollars. Exports are largely to Canada. Alaska is buying more coal each year.

in 1910. These figures do not include bunker or fuel coal laden on vessels in the foreign trade which aggregate 5,578,497 long tons for this period in 1911.

Of the total bituminous exports, 8,933,044 tons were shipped to Canada, and, for the same period last year, this amounted to 6,432,632 tons, showing an increase of approximately one-third in this trade alone.

The total export bituminous trade for the year of 1911 is estimated at about 14 million long tons, as compared with 10,784,239 long tons for 1910. The total bunker or fuel coal laden on vessels in the foreign trade will be approximately, 6,700,000 long tons, as compared with 6,445,593 long tons in 1910.

GROSS ESTIMATES FOR 1911

The total shipments of both bituminous and anthracite coal, including that laden on vessels in the foreign trade will, for the year 1911, be approximately, 24,320,000 long tons, as compared with 20,251,459 tons for 1910.

The total exports of coke for the first ten months of 1911 were 777,861 tons, as compared with 715,196 tons for the same period in 1910, showing a material increase in this department. The total exports of coke for the entire year are estimated at 933,400 tons, as compared with 879,073 tons for the year of 1910, showing a material increase in the coke trade for the year just closed.

While the figures in our export trade for the year now closed show heavy increases all along the line it should be remembered that conditions have not been normal during this period. The British Columbia mines during about two-thirds of 1911 were practically closed down and since Canada is the destination of fully three-fourths of our export coal this has necessarily caused a heavy increase in shipments to that market.

EXPORTS TO PANAMA

As a natural result of the activity at the Panama Canal, exports of fuel to that trade has shown a steady and heavy increase during the last few years.

In 1908 the total exports to Panama amounted to 345,464 tons valued at \$909,512. In 1909 this trade increased materially, the total tonnage for that year being 427,462 tons valued at \$1,168,774. An increase was still evident in 1910, but not of such proportions as that for 1909. The total tonnage for 1910 was 497,316 tons, valued at \$1,321,378. The total tonnage shipped to this trade for the first ten months of 1911 was 417,476 tons, valued at \$1,071,494 and it is estimated that for the year of 1911 these exports will amount to slightly over a half a million tons.

PHILIPPINE ISLANDS

For the first time in a number of years no coal has been exported to the Philippine Islands. In 1909 there were exported to this point, 155,655 long tons and in 1910 the exports amounted to 118,389 tons, while for the present year the Islands are apparently drawing on their own supply.

EXPORTS TO PORTO RICO

Our Porto Rican export trade is not well established yet and a review of this market over the past three years shows considerable fluctuation in tonnages. In the main, however, this trade appears to be on the increase. In 1908, the total shipments of both bituminous and anthracite to Porto Rico amounted to 88,624 tons. In 1909 this trade fell off to 75,927 tons, valued at \$232,679. In 1910 another heavy increase was experienced, the total exports for that year being 108,105 tons, valued at \$333,547. The total exports for the first ten months of 1911 were 86,745 tons, and the total tonnage for the year is estimated at 104,000 tons, or about 4000 tons less than for 1910.

ALASKA

Exports to Alaska, while comparatively light, continue to show an almost uninterrupted increase.

For 1908 the total of both coal and coke amounted to 21,509 tons valued at \$137,567 and for the year following the tonnage was 29,684 tons valued at \$191,420. During 1910 the tonnage fell off slightly amounting to only 28,833 tons valued at \$177,127.

The total shipments for the first ten months of 1911 were 28,277 tons valued at \$158,224. For the entire year it is estimated the shipments will total more than 30,000 tons the largest tonnage yet recorded.

Coastwise Trade Conditions in 1911

By J. J. Wolkins*

Coastwise tonnages for the year have been unusually heavy, particularly in anthracite. Some new high rates on water freights were recorded.

*50 Congress St., Boston, Mass.

In New England, 1911 was a year of large tonnages. Receipts at the port of Boston were well in excess of 1910, both in anthracite and bituminous, and had soft coal yielded better prices, the dealers generally would have called it a fairly good year. The early months were favorable to coal consumption, and were followed by a prolonged dry season cutting down the supply of water power for the mills. Then in August began the most unusual succession of fogs and gales that prevailed through the fall months and sent freights up to more than double the summer figures.

THE BITUMINOUS TRADE

The bituminous trade has been the despair of the larger agencies. A weak situation early in the year gave little hope for fair prices, but for a time it seemed the West Virginia operators might settle their differences. All efforts, however, proved futile, for no sooner had the season opened strong with a contract price of \$2.70 f.o.b. Hampton Roads, Va., or \$3.63 gross tons weighed on cars at Boston for inland delivery, than an open cut was made March 31, to \$3.30 on cars for the year, a price based on the water freights then current and netting less than \$1 at the mines for the best brands of Pocahontas and New River.

MARKET SETTLED INTO DULLNESS

For awhile the low values of 1909 looked certain to be duplicated, but at length, after all sorts of efforts to save the season, the market settled into a summer dullness at a range of \$2.40 to \$2.50 f.o.b., less selling commission, and \$3.10 to \$3.20 on cars at Mystic Wharf. Buyers were encouraged to hold off until minimum prices were to be had, and all the shippers were not only long on coal, but most of them were forcing supplies on the market rather faster than they could be absorbed. This condition held until late in August or September when large consumers began to worry over the slow movement of water transportation and pressed for deliveries on their low-priced contracts.

Bottoms were making but three trips when normally they would have made five and six, and with several heavy losses besides, by wreck and partial damage, a serious shortage became apparent late in September. Water freights advanced on big vessels, Virginia ports to Boston, from 60c. to \$1.25 within a few weeks, and at the end of the year there was only a slight recession to \$1.10 and \$1.15. Coal at the loading ports is now reported to be in short supply, and for

spot shipment would command a higher price than was secured on any contract business the year through. Current prices on cars Boston are around \$4.00, and most of the shippers have been obliged to buy outside at present prices in order to tide over customers until they could make deliveries of their own.

A LESSON TO WEST VIRGINIA OPERATORS

The year's experience should be valuable to the West Virginia operators for it must have shown how easily a big tonnage can be thrown away, with no adequate return. In a word, the trouble has been an over anxiety on the part of too many sales agencies to place tonnages in this market, without apparent regard to the returns that would have to be made later. If there was one feature worse than another, from April to July, it was the practice of sending cargoes here unsold, and then hammering prices to attract small buyers. So long as "protection" is guaranteed the buyer, the slow season can never be improved until the "auction hazard" is eliminated.

The principal Georges Creek shippers have apparently enjoyed a satisfactory year. They have an advantage of 15c. in rate to tide over West Virginia mines, and with an ample fleet of steamers, tugs, and barges have been able to live up to contract obligations and have coal for sale besides at lucrative figures.

Bituminous all-rail has been heavy all the year. The low prices at tide diverted a large tonnage that would ordinarily be railed from the Pennsylvania districts, and it was to be expected that the mines with less well established selling connections would suffer most. The better known shippers have had to make low prices to keep up anything like a normal output, and prices have ranged down to 85c. on coals higher in ash and volatile. The better grades from Somerset and Cambria counties have lately advanced from \$1.20 to \$1.35, in response to a slightly better demand.

At tide-water most of the Pennsylvania shippers have been in straits all

the season. When Southern prices moved up in October there seemed an opening for a large tonnage from Philadelphia, but rates were soon advanced for shipment in anthracite transportation in sympathy with those from Hampton Roads, and a promising outlook faded away. The retail price of bituminous in Boston was advanced from \$4.25 to \$4.50, net tons, Dec. 1.

Generally, the 1912 prospect is good for bituminous. The mills and corporations all over New England are enjoying fair business, and each year seems to mark requirements up to a new high figure.

ANTHRACITE

The year of 1911 was a record one for anthracite. The cold easterly weather from January on made stocks unusually light when the shipping season started and the months from March to June a very heavy tonnage was taken on. The usual April demand, both at tide and all-rail, lasted well into the summer, and there was a notable shortage of free stove and hard egg. Indeed the companies are still behind on orders for stove, and there was no apparent slackening in the demand at the end of the year. Early in September a cool wave brought in an extra business and it was not long before the anthracite companies had requests for prompt shipments on all sizes. The slow movement of barges had the effect of shortening up supplies and during October, November, and December the shippers were swamped with orders and there has been anywhere from three to six weeks' delay.

THE SITUATION GREW ACUTE

In December the situation grew really acute; for the first time in years certain of the producing companies allowed their Eastern storage depots to go practically bare of stock, and with no early replenishing in sight. Warm weather before Christmas relieved the situation somewhat but the last days of 1911 saw the big cities in the market again and eastern shipments as slow as before. Chestnut size has continued in strong demand all the year, and the 25c. advance over the usual circular Apr. 1, has been easily maintained.

The end of 1911 saw another announcement, this time a similar advance in the contract price of broken coal, to \$5.00 alongside. These advances, together with those in pea and the steam sizes within a year or two leave stove and egg the only sizes that have not been advanced since 1903. The anxiety over strike possibilities in the spring no doubt accounts in part for the increased ton-

nage in this section, but that does not deprive 1911 of its position at the top of recent years in anthracite.

A LARGE CONTRACT

The latest "big news" in 1911 was the purchase by the New York, New Haven & Hartford R.R., through its Boston offices, of about 3,400,000 tons of steam coal for delivery during five years for the New England lines of the so-called "Mellen System," including the New Haven Road proper and subsidiary companies

like the Boston & Maine and the Maine Central. The contract was made with the Virginia Iron, Coal & Coke Co. of Bristol, Va.-Tenn., operating mines on the Clinch Valley Division of the Norfolk & Western Ry., as producer, and the Coastwise Transportation Co. as carrier.

The biggest steam collier in the trade, the "Suffolk," has been chartered to bring part of this coal to Boston and to Portland, and it is understood that the Coastwise Transportation Co. will at once build a sister ship to the "Suffolk" to

assist in carrying the coal. It is believed that the construction of such ships as the "Suffolk" and the "Newton," launched in September, carrying upwards of 7200 tons, and making quick and regular trips, means the passing eventually of the large sailing vessels that have hitherto had most of the coastwise carrying trade. There are now seven of this largest type of steam collier, and some of them have made four round trips from Hampton Roads to Boston within a calendar month.

Review of Year's Coal Trade

By John H. Jones*

The coal tonnage in the United States for 1911 will nearly equal that of 1910, which was slightly more than 500,000,000 tons, or about 10,000,000 tons in excess of the entire production in this country from the time the first ton of coal was taken from the earth up to and including the year 1871. Not more than 60 years ago, the yearly production of the country did not exceed 7,000,000 tons; comparing this with the more than 500,000,000 tons of 1911, will give some idea of the wonderful strides which the coal industry has made and is making. That the production in 1911 has not shown a decrease over 1910 is accounted for mainly by the fact that while many of our largest manufacturing plants have not operated as fully as in years past, there is a steady increase in the use of coal for gas making, the production of electricity, railroad fuel and domestic consumption.

PRODUCTION OF COMING YEAR TO BE LARGE

While the production in 1911 has been rather unsatisfactory, 1912 will show (from present indications) the largest production in the history of the coal business, with an increase of from 10 to 20 per cent., or a total of from 550,000,000 to 600,000,000 tons. This, of course, will come from a simultaneous increase in other lines of industry. That increase will be brought about by the willingness of the largest corporations to comply with the law, and their desire to cooperate with the government to bring about better business conditions by legislation which will eliminate as far as possible the discontent on the part of capital caused by the attacks which have been made from time to time.

I think we should urge upon the government the appointment of commissions to settle such questions as monetary and tariff conditions, and, moreover, urge the establishment of a federal corporation law, which would be regulated in such a manner that capital would have a fair return upon its investments and at the same time the consumer be assured of the lowest possible prices for his purchases.

Coal production in 1911 while reduced by industrial depression is upheld by increasing domestic uses. Advanced legislation is favored in order to clean the slate and give capital assurance of stable conditions. Present liability law in case of a severe explosion with proved liability, would fail because of bankruptcy of the corporation involved.

*President, Pittsburg - Buffalo Co., Pittsburg, Penn.

The lake tonnage from all districts, for the 10 years ending 1911, is as in the following table:

LAKE TONNAGE FROM ALL DISTRICTS

	Pittsburg District	Ohio District	W. Va. District	Total
1902	4,704,093	2,689,974	965,769	8,359,036
1903	6,092,047	2,458,265	1,539,435	10,089,747
1904	6,058,383	2,138,247	1,279,876	9,476,506
1905	7,443,883	2,062,692	2,109,262	11,615,837
1906	9,287,272	2,560,906	2,743,732	14,591,910
1907	10,549,993	4,074,296	3,420,941	18,037,232
1908	8,700,000	3,600,000	3,450,000	15,750,000
1909	8,687,305	3,002,815	3,874,570	15,564,690
1910	11,911,900	4,297,300	6,629,500	22,838,700
1911	10,611,941	4,019,544	7,151,200	21,782,685

Employers of labor and their employees should endeavor to get closer together. Union labor should not be criticized for the acts of certain of its officials. The labor unions should discourage, collectively and individually, violence by their members. They should select from their ranks the most conservative and efficient leaders. Capital and labor must recognize that their interests are mutual. Where treating with union labor, capital should insist that the union officials be honorable and intelligent men, in order to deal honorably and intelligently with them. Where labor is not organized, capital should get closer to the men and treat them, as is already done by a large number of companies, in the way it would like to be treated. Capital should do everything possible to disarm labor,

whether union or nonunion, of the belief that it is its desire to make every dollar possible from its toil, regardless of its welfare. This is certainly not true of capital in most cases.

THE EQUITY OF A COMPENSATION LAW

A compensation law, which will provide for a man and educate his family in case of accident or death, will be a step in the right direction. Let us hope that Congress will recommend to the several states that such a law be passed. Let us also hope that no state will hesitate to pass a law which will bring about conditions which mean so much to the workingman and his family. A compensation law which means individual liability for the different companies, to be recovered through the courts of our country, is simply an encouragement to "ambulance chasers," and only pays compensation to the workingman where it can be proved beyond doubt that it was not through his own negligence that the accident happened. Why not pass a law which will pay a fixed amount to those families as long as they are dependent upon the income of the injured or deceased employee? For instance, in coal mining there are not 20 per cent. of the companies engaged in business today who would be able to pay the required indemnity under the liability law in case of a serious accident, requiring them to pay from \$100,000 to \$1,000,000. In connection with this liability law, the strictest kind of laws should be passed by the states to minimize the number of industrial accidents as much as possible and protect the lives of the workers.

More tonnage will be moved in the early part of 1912 than has ever before been moved in the history of the country. Consumers have been postponing the buying of necessities as long as possible, and supply houses have been postponing the stocking of their warehouses. They are now ordering ahead, and the mills and manufactories have orders to keep them going for the first six months of the year. The possibilities of the last six months will depend to a large extent upon the political situation.

Baltimore and Vicinity in 1911

By Leslie Rawles *

The year 1911 has been one of reduced sales and small profits for Baltimore operators. Yet when an impartial view is taken of conditions as a whole, and the depression which has existed in so many industrial lines throughout the entire twelve months is considered, the Baltimore dealers feel they have no cause for complaint.

MARKET CONDITIONS

It is true that when the present year made its advent, the hopes of the coal trade in Baltimore ran high. There was every evidence that there would be a general revival of business the country over. Operators had visions of prolonged activity in the steel industry, which would necessarily bring about a constantly increasing demand for their product; they saw an unprecedented traffic for the railroads, and these same railroads purchasing freely, thus stimulating the trade of the car manufacturing and supply companies, and adding zest to the coal market.

These hopes have not been realized to the extent that Baltimore operators had expected. Among the overly enthusiastic ones, the disappointment over the failure of the coal market to exhibit the life that was expected of it, is keen. But the conservative view taken by the trade here as a whole is that the year has been as good as one could expect in the face of the adverse business conditions which prevailed.

The steel industry did not have the boom expected and as these industries are looked upon as large consumers, the coal trade has felt keenly, the lack of orders which usually come from this source. The railroads in the East, and especially those which are closely associated with the business at this port, have had a fairly good year, but their policy of purchasing equipment and steel rails has been what might be termed a hand-to-mouth one and consequently the equipment and car specialty manufacturing concerns have been idle a greater portion of the time.

As a result of such conditions in the business world, the coal trade has been depressed. It is true that during some of the months of the year, coal has moved freely, representing shipments made under contract by Baltimore operators. And it might be said that nearly all the coal shipped in the past few months was called for under contract,

but under slightly reduced prices when compared with last year. In this section, renewals of contracts take place around Apr. 1. When this time arrived, some of the consumers came in under prices quoted by operators. Others did not, preferring to hold out and take their chances of getting the product cheaper by spot purchases. Later they did agree to take coal under contract, but, according to authentic reports succeeded in getting a slightly lower price quoted.

THE SPOT MARKET

The spot business, which plays so prominent a part in the Baltimore market, has been extremely disappointing.

In January this was somewhat brisk, and again in February, operators reaped satisfactory profits from this business. There was an easing off in the demand for coal in March, and during the complete slump which followed, the spot business disappeared. Contract shipments also eased up.

The early spring and summer months brought no improvement in the demand for coal. Inquiry at many of the offices elicited the information that consumers were entirely out of the market, and in many instances, operators disposed of coal at a price below the cost of mining it. Such stagnant conditions prevailed until the advent of October, when there was a slight improvement, as evidenced by the freer movement on the railroads over which Baltimore operators ship their product. The latter part of October found the demand not quite so brisk, and, while considerable coal moved in November, it was mostly under contract. The spot business was lacking, and the market bordering on stagnation.

Operators predict that the tonnage from Maryland and West Virginia mines operated by local companies will probably reach 19 or 20 million tons for next year, providing trade conditions get no worse. The opinion is that business is going to be better, and that the coal trade will share in the general improvement.

NEW DEVELOPMENTS

The improvements which are to make possible this increased output of coal, were, for the most part, started during 1911. Probably the biggest development inaugurated by any company throughout the United States, was that of the Consolidation Coal Co. in the Elkhorn Valley of Kentucky. This company owns a tract of 100,000 acres of high-grade coal, and is spending millions of dol-

lars in developing their property. It began the opening up of between sixteen and twenty mines at various locations on the tract, and expects to begin mining coal within the next two or three months. In addition, the Consolidation has practically completed the construction of the Sandy Valley & Elkhorn Ry., from the Chesapeake & Ohio Ry. at the mouth of Shelby Creek to Jenkins, Ky., the new town built by the company. It is expected that the Consolidation will be shipping 1500 tons of coal daily from this property by April first.

The Consolidation also started construction work on its big electric power station at Hutchinson, W. Va., which is to supply electric power to all the company's mines in West Virginia. It is to be one of the most modern plants in the world, and will have three, 1500 h.p. engines driving three 1000 kw. generators. It will be constructed so an addition equal to one-third of the original plant may be added.

The Davis Coal & Coke Co. did considerable work in the way of opening up additional mines in the Davis vein territory at Thomas, W. Va., four in all being opened. These new mines will be operated under the contract which the company has with the Bethlehem Steel Co., and which runs for 20 years. Delivery of coal under this contract will begin May 1, 1912. An additional mine was also opened up by this company at Dartmoor, W. Va., in the Beaver Creek district.

Three mines were opened up by the Georges Creek Coal Co., Inc., in the Tyson vein in Allegheny County, Md. This company was formerly controlled by the Georges Creek Coal & Iron Co., of Baltimore. The headquarters of the concern are now at Lonaconing, Md.

Of particular interest to Baltimore is the construction of the Buckhannon & Northern R.R., which was begun this year, from Rivesville, W. Va., to the Pennsylvania state line. This road is owned by the Baltimore & Ohio, the Pennsylvania and the Pittsburgh & Lake Erie R.R., a subsidiary of the New York Central system. When completed, the new line will tap about 60,000 acres of coal land which heretofore had no railroad facilities. The Little Kanawha Syndicate, which is controlled by these three roads, owns 60,000 acres of coal land to be traversed by the new line, and will open it up for development. It is expected that a large portion of the coal mined on this property will be exported through Baltimore.

*Baltimore, Md.

River Shipments at Pittsburg

Special Correspondence

Figures compiled by the United States Engineers for the first 11 months of 1911 of the amount of coal arriving in the Pittsburg harbor and also that shipped to down-river points, indicate a banner year in the river-coal business of the Pittsburg district. The estimate for December has not yet been completed but already a record breaking shipment has been sent on its way to Southern ports.

Were it not for the fact that during the summer the down-river boats were forced to tie up on account of low water, the coal shipments through Davis Island Dam this year would have greatly exceeded those actually made. During the summer of 1910 good stages of barge water prevailed at frequent intervals and the effect of this on the river shipments can be seen by glancing at the tables given below. But in spite of all this, taking the shipments for the first 11 months of 1910 and comparing them with the same period for 1911, it is found the shipments for 1911 are greater by 485,638 tons. When the December shipments have been tabulated this figure will be yet larger.

The table in next column shows shipments for the first 11 months of 1910 and 1911 in short tons. This table indicates a total tonnage of coal handled through the Pittsburg Harbor for the first 11 months of 1910 of 10,374,055, and for the same period of 1911 of 10,859,693.

The aggregate of the coal tonnage on the Monongahela River is arrived at by taking the coal shipped up through Lock

No. 1, plus the amount shipped down through Lock No. 3 and to this sum is added the amount mined and shipped in Pools 1 and 2 on the Monongahela River. The river tonnage on the Ohio River is obtained by adding the amounts shipped, both up and down that river, passing through Davis Island Dam.

to local points. An example of such a company is the Jones & Laughlin Steel Co., operating mines near California, Penn., in the Fourth Pool of the Monongahela River. Most of the coal mined and shipped by this concern is used at its mills in the Pittsburg Harbor, although of recent years much has been

OHIO RIVER SHIPMENTS, 1910-1911

	1910		1911	
	Monongahela	Ohio	Monongahela	Ohio
January	796,046	451,350	973,861	574,170
February	902,832	138,680	1,005,741	448,160
March	1,083,251	245,150	1,010,871	271,210
April	234,884	61,950	814,724	430,090
May	936,308	102,275	826,093	102,320
June	985,343	378,280	481,412	55,040
July	867,504	80,520	486,752	27,865
August	763,262	47,940	556,413	160,930
September	754,130	36,770	610,985	157,955
October	701,713	37,380	727,113	159,530
November	684,287	80,200	811,588	166,870
December	759,275	114,265	.....	.....
December	9,472,835	1,774,760	8,305,553	2,554,140
	759,275	114,265	.....	.....
11 months	8,713,560	1,660,495	8,305,553	2,554,140

Less than 10 per cent. of the coal shipped and mined on the Monongahela River is sent South, the larger portion of it being used in the local steel and other mills. According to the Monongahela River Consolidated Coal & Coke Co., one-third of all the coal they mine is shipped to the Southern trade, one-third to the Pittsburg Harbor for local consumption and one-third by rail to the Lakes and the Northwest. However, this company is the largest coal shipper to the South, most of the others confining their trade

sent through Davis Island Dam to its new plant at Aliquippa, Penn., on the Ohio River.

Despite the fact that the Monongahela River is slack-watered almost to its headwaters, the frequent stages of low water on the Ohio River, preventing continuous navigation, reacts on the former stream. This is caused by the inability of the operators to bring back the empty barges and coal boats to the local harbor, eventually resulting in a shut down at the mines.

The Mississippi Valley in 1911

By E. J. Wallace*

With the close of 1911 the operators of Illinois have put the year down as one of the most unsuccessful in their history. At no time during the past year has the price of Illinois coal gone beyond normal, and for the greater portion of the year the actual selling price of coal was around and below the cost of production.

The principal reason for this is the fact that the strike of 1910 caused much business that heretofore came to the Illinois field to be diverted to other fields, principally Indiana and West Virginia, and the Illinois operators have been unable to recover this lost ground. Again, the production of Illinois coal is grow-

ing twice as fast as a logical market for it is being developed, and the result is that today Illinois can produce twice as much coal as there is any natural demand for in its territory. The development of new mines has not been as extensive in the northern field as it has in the southern, where several new mines have been started or completed in the counties of Williamson and Franklin, and also in that great coal field adjacent to East St. Louis, including the counties of Madison, Macoupin, Montgomery, Bond and St. Clair.

In contrast to this a few mines have been abandoned, but they were of small tonnage, and the closing up of these did not affect the market in the least. The operators in the Illinois field have been hampered considerably by the taking up

in a serious way by the miners of petty grievances, and perhaps one important change that would help better conditions was the effort made to use a new explosive in the mines of Franklin County in place of the ordinary black powder. In some mines the operators were successful, and in other instances strikes were local and long.

COSTS AND PRODUCTION IN ILLINOIS

The cost of coal in the Franklin County field has been increased considerably on account of the operators taking the precaution to guard against coal dust explosions by installing sprinkler systems, and by putting on additional fire runners to guard against fires after the shot firers are through. The "wild-cat" sinking of

*The Dealers' Fuel Co., St. Louis, Mo.

mines has been put a stop to by the law that went into effect over a year ago, which requires all shafts and air shafts to be constructed of concrete, and this has had a tendency to stop almost entirely the promotion of speculative mines. In the coal field adjacent to St. Louis there has been no change of note during the past year, unless it be that the operators are poorer as a result of trying to do business in a shrinking market.

In the central- and northern-Illinois districts there has been no great development to any extent, and the tonnage here as in the southern field has always exceeded the demand. The low coal in this section offers many serious problems that are usually met with locally.

The production of Illinois coal for 1911 will not exceed, it is believed, the production of other years, under normal conditions. It is true that at the present time the state of Illinois, without opening another mine, can produce fully 100 million tons, while the market for Illinois coal cannot absorb more than 50 million tons. It is figured that Illinois coal, during the year 1911, brought between 3 and 5c. per ton less than in the previous year. There are no complete figures at this time to show what the tonnage for the year 1911 has been, but it is estimated at between 50 and 65 million tons. There is practically no coke produced in the state of Illinois, excepting at two or three points, and this production is insignificant when compared to the productions of other states.

MISSOURI

The year 1911 marked the beginning of the downward trend of coal operations in Missouri. There have been practically no new mines sunk in the state and several of the small older mines have been abandoned. As a whole, there were few mines in the state that made expenses, as the demand for Missouri coal is limited, as well as its market. This, chiefly on account of the higher grade coals produced in the other states surrounding. The Missouri coal market has been lost chiefly to coal from the Carterville and Springfield districts in Illinois, and there seems to be no hope of recovering this lost ground.

There is a feeling against the development of any more coal lands in Missouri on account of the low vein, and the high mining scale, and it is expected that from now on every year will show a lower figure in the coal production for this state. No coal produced in the state of Missouri reaches the St. Louis market, although a fair tonnage from the central western portion gets in to Kansas City and St. Joseph, and the market in the former city is limited on account of the use of natural gas.

ARKANSAS

The situation in Arkansas is a peculiar one, and it has developed so during 1911. In the semi-anthracite field of Arkansas there has been a good demand for the coal, and the market has been widening to some extent. This coal is gradually

growing in favor on account of its superior quality, although it is produced under difficulties that are experienced in but few other mining sections. However, the cost of production is so great that only by the aid of favorable railroad rates can this coal compete with the higher-grade coals of other fields, but where these rates are practically the same, Arkansas coal is almost eliminated.

In the bituminous mines there has been no notable increase in the production as this coal is not of that superior quality where it can win its way into foreign markets. However, as the state of Arkansas is developing fast it will continue to create a growing market, which will no doubt take care of the present tonnage for the next few years, but if further development of the coal is contemplated, the condition in Arkansas will be much the same as it is in Illinois. During the past year three of the largest cities in the state have practically abandoned the use of coal, for natural gas and oil. Every city and town on the main line between Little Rock and Texarkana are now using natural gas from the Louisiana fields, and the same condition exists at Pine Bluff. In sections isolated from the gas mains the steam plants are looking with favor upon fuel oil, and there is nothing promising for future steam-coal production in this state. The encroachment of oil and gas, while affecting Arkansas production, is also hurting the operators of Illinois and to a greater extent in the southeastern portion of Missouri, and northern Louisiana.

Great Britain's Coal Industry, 1911

Special Correspondence

The British coal industry was considerably affected during the past year by labor troubles, especially in South Wales, and by the recent railway strike. Yet in spite of these difficulties, the pessimistic utterances of the president of the British Association, and the lamentations of the statisticians, to the effect that coal mining is not profitable below a certain depth, the industry, as a whole, is cheerful at the beginning of the year 1912.

YORKSHIRE

The various coal fields are producing up to their maximum output except in Yorkshire, Nottingham, and a mine or two in South Wales. It has been reported during the year that Yorkshire is underlaid by a vast coal field which was previously unknown and that in the course of several years 40,000 miners would be given employment in this region. But such is not the case. On the contrary, signs are not lacking to indicate that the remarkable development

begun in South Yorkshire in 1900 has already reached its climax. This fact is due to the geological conditions that make shaft-sinking extremely expensive; the coal measures being overlaid by Permian and Triassic formations which contain quicksands and large volumes of water.

At Thome colliery as much as \$1,250,000 has been spent the past year in sinking two shafts to a depth of 600 ft. each, owing to the fact that it was necessary to pump out 9000 gal. of water per min. The ultimate depth of these shafts is to be 2760 ft. At the Halfeld main colliery, near Doncaster, the "Francois" system of injecting cement into the strata as a preliminary to shaft-sinking was tried for the first time in Great Britain.

THE MIDLANDS

During 1911, six new colliery companies started shaft-sinking in the Midland coal field, each mine being designed for

an output of at least 1,000,000 tons per year, and altogether there are now 12 shafts being sunk in this locality. The increase of production in the Midlands has overtaken and exceeded the export trade with the result that a number of the older mines closed down when the newer and better equipped operations dumped their surplus output on the market. The erection of large central power plants and the consolidation of various groups of collieries in this region have both been in evidence during 1911.

In the Lancashire coal field, at Astley Green, the deepest colliery shaft in Great Britain is expected to be completed early in the coming year. This shaft will have a depth of 3360 feet.

During November, this year, much interest was aroused by the discovery of coal at Calvert, in Buckinghamshire, about 50 miles north of London. The geological conditions are here similar to those in Kent, yet owing to the thinning out of some formations, the coal

measures were found about 540 ft. from the surface, and three small seams have been encountered.

COAL MINE BILL

The coal mines bill for 1911, although a non-party measure, has been discussed even more than the Eight Hour act of 1908, which latter is now giving satisfaction. The chief discussion has centered around the use of electricity in gaseous mines, the abolition of naked lights, employment of female laborers on the surface, the provision of baths and wash houses and in connection with the

rescue and ambulance equipment. The bill was not opposed in regard to its provisions for insuring the safety of mines and miners, but because of the increased cost which will devolve on some of the older collieries as a result of its being passed.

The Great Central Railway has just completed at Humber, a coal dock which is said to be the largest in the world. This dock has a capacity of 12,000,000 tons of coal per year on the basis of working 12 hours a day. Its eight hydraulic hoists can each handle 320 loaded cars a day. The cost of handling is much less than was heretofore possible.

COAL OUTPUT

The output of coal in 1910 was 264,337,786 tons, and for 1911 will probably exceed 270,000,000 tons. The number of workers employed in the mines has passed all previous records, and shows an increase over 1910. In 1851 nineteen persons were killed for every 1,000,000 tons of coal mined in Great Britain; in 1910 the death rate was 6.37 per million tons, whereas for 1911 the rate has been reduced below 6, there having been no serious explosions.

Chronology of Coal Mining for 1911

JANUARY

Jan. 3—Explosion and fire at the Sydney No. 3 mine of the Nova Scotia Steel & Coal Co. killed 8 men.

Jan. 4—Strike of 12,000 coal miners in Belgium was declared.

Jan. 10—A cave-in occurred at the Natia mine, Castro Urdiales, Spain; 190 men were entombed and 40 killed.

Jan. 20—An explosion and fire in the Casimir mine at Sosnowice, Russian Poland, killed 40 miners.—The Executive Council of the American Federation of Labor granted a charter to the Western Federation of Miners on the same basis as to the United Mine Workers of America.

Jan. 25—Explosion at the Hughestown No. 10 colliery of the Pennsylvania Coal Co. at Pittston, Penn., killed 6 and injured 5 men.

FEBRUARY

Feb. 6—Three men were killed at mine of Independent Coal & Coke Co., Kenilworth, Utah, by Greek miners on strike.

Feb. 9—Explosion at Cokedale Mine of American Smelting & Refining Co., near Trinidad, Colo., killed 15 men.

Feb. 17—Ninth annual meeting of western branch of Canadian Mining Institute.

Feb. 26—Fire was discovered in the Hazel mine of the Pittsburgh-Buffalo Coal Co., near Cancnsburg, Penn.

MARCH

March 9—Lehigh Coal & Navigation Co., announced plan to build large electric plant at mines in Pennsylvania for high tension distribution of power over extensive area.

March 18—Explosion in Mine No. 16 of Missouri, Kansas & Texas Ry. Co., at West Mineral, Kansas, killed 6 men.

March 22—Fall of roof in Hazel Mine of Pittsburgh-Buffalo Coal Co., East Canonsburg, Penn., killed 9 men.

APRIL

April 1—Coal miners of Crows Nest

A record of important happenings arranged for ready reference. Also incidents and events of more than passing interest.

Pass region of British Columbia and Alberta inaugurated strike.

April 3—U. S. Supreme Court upheld commodity clause of Interstate Commerce Law which prevents a railroad from owning stock in a coal corporation shipping over its lines.

April 7—Fire in the Throop mine of the Price-Pancoast Coal Co., Lackawanna County, Penn., killed 73 men.—Miners in British Columbia and Alberta agreed to submit wage dispute to arbitration.

April 8—Explosion at Banner mines of Pratt Consolidated Coal Co., Jefferson County, Ala., killed 128 men, mostly convicts.

April 11—U. S. Steel Corporation opened \$5,000,000 coke-oven plant at Gary, Ind.

April 24—Explosion in Ott mine, No. 20 of Davis Coal & Coke Co., near Elk Garden, W. Va., killed 10 men.

April 28—Gypsy Grove breaker of the Pennsylvania Coal Co., at Dunmore, Penn., burned down, killing 2 men and seriously injuring four. The total loss was \$50,000.

MAY

May 11—Fire at the Boston colliery of the Delaware & Hudson Co., Larksville, Penn., suffocated 5 men.

May 12—Mine tipples and buildings of the Pierson colliery near Jasonville, Ind., were destroyed by fire.

JUNE

June 6—The 100th meeting of the

American Institute of Mining Engineers opened at Wilkes-Barre, Penn.

June 19—Summer meeting of the West Virginia Coal Mining Institute opened at White Sulphur Springs, W. Va.

June 21—Dissolution of the E. T. du Pont de Nemours Powder Co. was ordered on account of violation of the Sherman anti-trust act.

June 28—Summer meeting of Coal Mining Institute of America opened at Indiana, Penn.

JULY

July 6—Suit was filed by the U. S. Government against the Lehigh Valley R. R. Co. under the commodities clause of the interstate commerce act.

July 15—Explosion in the mine of the Cascade Coal & Coke Co., at Sykesville, near Du Bois, Penn., killed 21 men.

July 17—U. S. Government filed suit to compel separation of the Reading R.R. from the Reading Coal Company.

AUGUST

Aug. 1—Explosion in the mine of the Standard Pocohontas Coal Co., at Shannon, W. Va., killed 3 men.

Aug. 4—Suit was filed by the Government at Columbus, Ohio, against 6 railroads and three coal companies charging combination in restraint of trade.

Aug. 10—A four-deck cage dropped in the Krupp-Hannibal mine near Bochum, Germany, killing 25 men.

SEPTEMBER

Sept. 8—Death of F. B. Robbins, for sometime president of the Pittsburgh Coal Co., and of the Monongahela River Coal Company.

Sept. 9—Merger effected at Cleveland of several independent steel companies into the Great Republic Steel Co.; Capitalized at \$36,000,000.

Sept. 16—First-aid meets were held at Shamokin, Penn., Inkerman, Penn., and Trinidad, Colo.

Sept. 21—Death of John Bond Atkinson, president of Kentucky Mining Institute.

Sept. 30—H. C. Frick Coke Co. secured title to about 16,000 acres of coking coal from Pittsburg Coal Company, and Monongahela Consolidated Coal Company, the transaction involving about \$18,000,000.

OCTOBER

Oct. 3—Fire destroyed the East Boston breaker of the Payne Coal Co., near Wilkes-Barre, Penn. Loss \$100,000.

Oct. 5—Fire destroyed the Cuckoo mining plant of the South Chandler Coal Co. near Canon City, Colo. Loss \$25,000.

Oct. 6—Cage fell 80 ft. at the Peabody mine, Nokomis, Ill., injuring 8 men.

Oct. 10—Control of the Monongahela River Consolidated Coal & Coke Co. was absorbed by the Pittsburg Coal Co.—The 101st meeting of the American Institute of Mining Engineers opened in San Francisco.

Oct. 14—Reorganization of Peoples Coal Co., of Scranton, Penn. was effected.—Small fire occurred in the No. 9 mine of the Lehigh & Wilkes-Barre Coal Co. at Sugar Notch, Penn.

Oct. 18—Explosion in coal mine, Bardot, France, killed 26 men.

Oct. 20—Fire in the No. 8 mine of Brazil Block Coal Co. threatened the lives of more than 100 men.

Oct. 23—Explosion in O'Gara mine, No. 9 at Harrisburg, Ill., killed 8 and injured 10 men.

Oct. 24—The 14th annual convention of the American Mining Congress opened at Chicago.

Oct. 30—The National Mine Safety Demonstration opened at Pittsburg, Penn.

Oct. 31—The tri-district convention of the United Mine Workers of America, opened at Pottsville, Penn.

NOVEMBER

Nov. 9—Explosion in the Adrian mine of the Buffalo, Rochester & Pittsburgh Coal & Iron Co. near Punxsutawney, Penn., killed 8 men.

Nov. 10—Reorganization of the Pennsylvania Coal & Coke Co. was effected with a capitalization of \$7,500,000.

Nov. 15—Freight reductions went into effect between Salt Lake City and Missouri River points.

Nov. 17—Canadian coal strike was settled by agreement signed at Hosmer, B. C., under which miners returned to work, Nov. 20.

Nov. 18—Explosion in mine of Bottom Creek Coal & Coke Co., at Vivian, W. Va., killed 18 men.

Nov. 20—Serious cave-in occurred at Scranton, Penn.—Coal Miners of British Columbia and Alberta resumed work.

Nov. 21—Hearing of Pittsburg-Lake coal rate case was started by Interstate Commerce Commission.

Nov. 28—Non-union Miner was shot at Louisville, Colo., in conflict with strikers.

DECEMBER

Dec. 4—Winter meeting of West Virginia Coal Mining Institute opened at Fairmont, W. Va.

Dec. 9—Explosion in Cross Mountain Mine No. 1, of Knoxville Iron Co., at Briceville, Tenn., killed 84 men, 5 entombed miners being rescued alive.

Dec. 11—Mid-winter Meeting of Kentucky Mining Institute opened at Lexington, Ky.

Dec. 12—Fire destroyed the top works of the Northern Central Coal Co.'s mine at Higbee, Colo.—The United Mine Workers of America balloted for their national officers.

Dec. 13—Eastern Ohio Coal Operators Association entered complaint before the Interstate Commerce Commission against three railroads, regarding freight rates to Lake Erie ports.

Dec. 18—American Federation of Bituminous Coal operators was organized at Chicago.

Dec. 19—Mid-winter Meeting of Coal Mining Institute of America opened at Pittsburg.

Dec. 23—Pit of Cross Tetley Coal Mine at Wigan, England, was flooded and the lives of 200 miners endangered.

Dec. 23—Six miners were killed by firedamp explosion at Teutoburgia colliery, Dortmund, Germany.

Dec. 24—Ohio and Pennsylvania operators declined to enter into interstate agreement with Illinois and Indiana operators.

Lake Tonnage for 1910 and 1911

According to the reports of the Hocking Valley docks at Toledo for the lake season of 1911 there was an increase of 175,455 tons over the amount handled by the docks in 1910. During the season of 1911 the docks handled 2,253,069 tons as compared with 2,077,614 tons in 1910.

The tonnage secured for the lake trade from the various mining districts in Ohio and West Virginia was as follows: Hocking district, 662,388 tons as compared with 666,218 tons in 1910; Kanawha & Michigan district, 886,405 tons as compared with 885,562 tons in 1910; Chesapeake & Ohio district, 651,205 tons as compared with 492,101 tons in 1910; Kanawha & West Virginia district, no tonnage as compared with 12,239 tons in 1910; Coal & Coke district, 816 tons as compared with 13,449 tons in 1910; Norfolk & Western district, 50,781 tons as compared with 6367 tons in 1910; Wellston district, 1443 tons as compared with 1678 tons in 1910.

Coal and Coke Production in the United States

The following table has been compiled largely from data communicated by the several state mine inspectors, estimates having been made only where no such statistics were available, but in all cases upon the basis of good information:

PRODUCTION OF COKE IN THE UNITED STATES

States	1910, Short Tons	1911, Short Tons
Alabama	3,249,027	2,784,880
Colorado	1,190,901	946,284
Georgia	40,000	25,000
Illinois	390,000	375,000
Kansas	10,000	10,000
Kentucky	58,700	60,000
Missouri	5,000	5,000
Montana	58,200	52,300
New Mexico	510,000	450,000
Ohio	260,000	240,000
Oklahoma	30,000	30,000
Pennsylvania	22,875,000	19,403,750
Tennessee	240,000	210,000
Utah	141,050	140,000
Virginia	1,264,300	901,000
Washington	40,000	35,000
West Virginia	3,803,881	2,200,000
Other states	1,890,000	1,470,000
Total	36,056,059	29,338,214

PRODUCTION OF COAL IN THE UNITED STATES

States	1910, Short Tons	1911, Short Tons
Bituminous:		
Alabama	16,139,228	14,500,000
Arkansas	1,870,000	(a) 1,700,000
California	10,000	5,000
Colorado	12,104,887	10,075,861
Georgia	180,000	168,000
Illinois	47,064,500	(a) 48,411,000
Indiana	18,125,244	14,070,000
Iowa	7,260,000	(b) 7,574,919
Kansas	5,100,450	6,000,000
Kentucky	14,750,092	(a) 15,000,000
Maryland	5,009,600	4,500,000
Michigan	1,620,000	1,500,000
Missouri	2,980,700	(a) 3,000,000
Montana	3,050,000	(d) 2,913,397
New Mexico	3,616,665	3,440,022
North Dakota	385,882	395,000
Ohio	33,876,400	30,500,000
Oklahoma	2,840,000	2,800,000
Oregon	55,000	50,000
Pennsylvania	148,471,826	143,978,671
Tennessee	6,750,000	5,950,000
Texas	1,940,000	1,875,000
Utah	2,526,094	2,501,472
Virginia	5,750,041	5,490,000
Washington	(b) 2,490,047	(b) 2,371,481
West Virginia	59,690,300	60,500,000
Wyoming	7,469,452	7,027,000
Total bituminous	411,126,408	396,296,823
Anthracite:		
Colorado	70,586	64,379
New Mexico	8,000	(a) 8,000
Pennsylvania	82,591,649	86,823,686
Total anthracite	82,670,235	86,896,065
Grand total	493,796,643	483,192,888

(a) Estimated. (b) Fiscal year ending June 30. (c) Includes output of byproduct coke for Massachusetts, Maryland, Minnesota, New York, Michigan, Wisconsin. (d) Year ending Oct. 31.

The State of Indiana produced 18,125,244 tons of coal in the year 1910, an increase of 4,433,155 tons, or 32 per cent. Of this total 17,249,785 tons was bituminous and 875,459 tons was block coal. The proportion of machine-mined coal was 10,888,367 tons, while 7,236,877 tons was mined by hand.

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This journal is interested solely in matters relating to the fuel industries, and is designed to be a medium for the free interchange of ideas, the detailed description of coal-mining practice, and the expression of independent thought calculated to benefit both operator and miner.

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COAL AGE

The Year 1912

The year just commenced is likely to prove an eventful one to coal men. Notwithstanding the much talked of hesitation and caution that is supposed to accompany each presidential year, there are good indications that the wheels of industry are beginning to turn a little faster, and it is possible the coming twelve months will be a period of marked prosperity.

Much heralded events seldom fulfil expectations. We have been told so often that 1912 (presidential year) is to be a time of lethargy in business due to the activities of politicians who desire to manufacture campaign material, that companies and individuals have prepared to withstand a siege, and repulse any attack that may be precipitated.

The past two years of curtailment in business expansion has healed many sore spots. Weak links have been eliminated and the commercial chain is stronger than ever before. Best of all we have entered a period of growth based on no less solid foundation than the provision of necessities for a rapidly increasing population. We have been taught that prosperity does not necessarily mean inflation, and that the utterances of a few rich men, who temper their words according to the state of their indigestion, cannot block the advance of the great body of industrial workers in America.

As a nation, we have unlimited natural resources, great visible wealth, and the willing hands and restless brains necessary to the development and increase of these valuable assets. Too many people mistake the meaning of an occasional drawing-back; they think it is a retreat, when it is but a preparation for another and greater leap ahead.

There has been no unusual advance in coal mining this last year, but the growth has been healthy. Innovations have been rare, however, more attention than usual has been given to perfecting present methods and to safeguarding the men underground. Prices have been rather unsatisfactory, but most operators have

made both ends meet, and have brought their mines to a point of efficiency that will enable them to take advantage of the coming upward swing in business.

Legislation, especially with reference to employer's liability, will occupy the principal attention of coal-mine owners in 1912. It is also to be hoped that the year will witness a closer understanding between operators, not only in each district, but in each State. Competition is to be desired, but not a business war that will destroy all and fail to benefit even the consumer.

That consolidations are to be desired is proved by the distory of recent events. In 1904 and 1905, mines in several states were organized into a number of large companies and the beneficial result was clearly shown in an immediate bettering of conditions for the men; an improvement in mining methods, and the installation of modern machinery. The large companies were able to do things the small fellows could not attempt. Coal does not grow like fruit or grain and a pound wasted is a pound lost forever.

The talk of an extended strike in April should not be taken too seriously. The men will, of course, demand an increase in wages, shorter hours, etc.; however, there is little likelihood but that a fair settlement of differences will be reached. A strike will probably occur, but we hope and expect it will be of short duration, and be more in the shape of a temporary suspension that will injure no one.

By April 1, anthracite operators will be well stocked with coal. Mines in West Virginia, Alabama and other unorganized states will be able to supply fuel to meet any deficiency. Last and most important, coal miners are already receiving wages higher than ever before in the history of mining, and the slack between the "increase in the cost of living" and "an equal advance in wages" has been taken up. The chief labor leaders do not desire a serious conflict, knowing from late history that the time is inopportune, and the few minor officials who have assumed a belligerent attitude will probably be overruled.

Blackdamp

Many nontechnical words have an indefiniteness which serves a useful purpose for a while. And this commendable breadth of purview is often their complete undoing because they are liable later to be submitted to a narrow definition covering only a part of the ground they formerly covered, and thus their meanings become uncertain and obscure.

Those scientists who cater to the unscientific will try in vain to save the life of the word "blackdamp" as a specific scientific entity, though it might be left to live a long and useful life as a roughly generic word. It would be well constantly to revert to the fundamental meaning of the word. When a light is brought into an atmosphere in which it tends to expire or when a light in an unventilated atmosphere dulls in the air it has befouled, then blackdamp is present. The light deadens or actually dies out and the black darkness resulting causes the agent of that darkness to be termed appropriately "blackdamp."

This definition seems satisfactory. It is not technical and we need a nontechnical word which will cover the condition in a noncommittal manner, leaving it open to later investigations perhaps to determine what the nature of that particular blackdamp may be.

But blackdamp has not been permitted to remain the name of a flame-extinguishing gas *per se*. It is said that afterdamp, though it may dull or quench flame, is not blackdamp because carbon monoxide is present. So, according to some definers, we cannot distinguish blackdamp unless we know either the cause of its existence or its analysis and the term becomes needlessly exact and by that token less useful.

Some years ago blackdamp was declared a nontechnical term for carbon dioxide. A new use of the colloquial word was advocated as that word was less technical in appearance than that which indicated the definite chemical combination. But this twist in the recognized meaning of a familiar word nearly destroyed its value, because it was soon discovered that an extinctive natural atmosphere, which is a true "blackdamp," was always depleted of free oxygen whether rendered extinctive by the burning of lamps, the respiration of animals, or by the action of the mine walls.

So blackdamp has been twisted a second time to mean the mixture of carbon dioxide with an excess of nitrogen and its allied gases above their standard presence in common air. But this is clearly a technical definition; it does not represent an actual, existing gas nor even the full sum of the impurities of any actually existing gas, nor yet the change due to a certain single chemical or physical action.

It is a fact that "air" is still "air" and will be styled "air" though we now know it contains argon, krypton, xenon, helium and neon, as well as carbon dioxide and a little hydrogen. Nevertheless, the meaning of the word "air" is still definite because it includes all normal elements and gas compounds in an existing mixture—the atmosphere. But blackdamp only includes, we are now told, part of a mixture, to wit—carbon dioxide and nitrogen. Some would say moisture, if present, might be accounted a part of the blackdamp.

But some would declare that if methane is present, it cannot be considered a part nor can carbon monoxide or hydric sulphide. Yet others might even permit methane to be rated as blackdamp if the oxygen were low in percentage because a large percentage of methane extinguishes flame. All air vitiated by seclusion in the mines contains methane. And secluded air is the most common form of blackdamp, of which methane might under a new definition be said to be a part. If the word discussed is to be limited by all the artificial restrictions by which technicians would hedge it, it has become a narrow term, which only a technical man can use aright and which we may confidently assert many technical men of long training are grievously misusing. Hence the need to retain the word in its pristine value, neither adding nor subtracting from the original definition.

The word "blackdamp" as recently constrained, redefined and newly conceived by Dr. Haldane, is the excess of inert gas above that in normal terrestrial air. The suggestion occurs that we abandon the "blackdamp percentage" of Dr. Haldane and describe the natural air as containing 79.1 per cent. of inert gas; then graduate his tube for "testing blackdamp" so as to give not "blackdamp percentage," so called; but the "gross

inert-gas percentage" in the air of the mine.

And this is advocated because it is a chemical device almost unheard of heretofore to group part of a constituent of a mixture under a different heading to that under which another part of the same constituent in like condition and of like qualities in the same mixture is grouped. And as it is true that the action of moisture and carbon dioxide by volume is not exactly equivalent to the action of nitrogen by volume, would it not be well to replace the words "gross inert percentage" by a more indefinite expression which would not indicate that the percentage was definitely indicated. We would suggest that this form of words should run "chemical index of inertia" or conversely "oxygen index," leaving the word "blackdamp" to express an atmosphere depressive of flame.

In conclusion it may be truthfully asserted that chemists of light and leading, do not know how to define blackdamp and will ascribe it to entirely different concepts in the course of a single article. Sometimes it will be an inert diluent of air. Sometimes it will be the diluted air itself. Even the context will be no guide. Nothing but the good judgment of the reader can follow the vagaries of the text.

Reversing Ventilation

Though the advisability of reversing the air current after an explosion or mine fire is a hotly debated question in this country, the English mining men seem definitely to favor that reversal. The Royal Commission of Mines as far back as 1906 considered the matter of such importance that it strongly recommended the provision at every mine, of means whereby the reversal of the air could be effected. The commission quoted several instances both of explosions and underground fires, wherein many lives might have been saved had it been possible to reverse the air without delay.

In this connection were instanced the fires at Hamstead, Whitwick, and the explosions at the Thornhill and Great Western collieries. Since then the explosions at the West Stanley and Whitehaven mines have strengthened the former conclusions. As a result, the new coal mines bill, which has just received the approval of both Houses of Parliament, requires that all fans shall be reversible.

Examination Questions

Selected from State Examinations, or Suggested by Correspondents

Some Pennsylvania Questions

BLASTING IN GASSY MINE

Ques.—In what way is blasting dangerous in a mine giving off marsh gas? Explain fully.

Ans.—The flame of the blast may ignite a body of gas that has accumulated in some pocket in the roof or in a void place in the gob and escaped the notice of the fireboss. The explosion of this gas may stir up and ignite the dust and cause a disastrous mine explosion. A windy or a blown-out shot is always more dangerous in a gassy mine, because even a small percentage of gas greatly assists the ignition of the dust that is thrown into the air by the force of the blast, and the result is more apt to be a mine explosion. The firing of a shot in a gassy mine is unsafe unless the place is first carefully examined for gas, and reported safe.

COAL-MINE GASES

Ques.—(a) What are the gases produced in coal mines? (b) Where are they to be found? (c) What are their relative weights?

Ans.—(a) The common coal-mine gases are marsh gas (CH_4), carbon monoxide (CO), carbon dioxide (CO_2), hydrogen sulphide (H_2S), and olefiant gas (C_2H_4). Hydrogen, oxygen and nitrogen, though occurring, at times, in mines, are not classed as mine gases; the two last named occur chiefly as air.

(b) In a well ventilated mine, outside of the return air current, these gases when present will be found at or near the place where they are generated. Marsh gas, being lighter than air, tends to accumulate at the roof or in rise workings at the face of steep pitches, where the air current is not sufficiently strong to sweep away the gas. Carbon monoxide is but a trifle lighter than air. It is principally found in close or poorly ventilated places, where shots have been recently fired or where combustion (oxidation) in some form has been taking place. Carbon dioxide, being half again as heavy as air, tends to accumulate at the floor or in dip workings, in swamps or other low places in the mine. Hydrogen sulphide is somewhat heavier than air, but does not occur in large quantities in coal mines. It would be found mostly in seams where pyrites occurs in the coal or the underclay, in low wet places or swamps where the air is dead. Olefiant gas never occurs in large quantity as a

separate gas, but is often associated with marsh gas and found under similar conditions.

(c) The relative weights of these gases are shown by their several specific gravities. They are as follows: Marsh gas, 0.559; carbon monoxide, 0.967; carbon dioxide, 1.529; hydrogen sulphide, 1.1912; olefiant gas, 0.978.

SAFETY LAMPS

Ques.—(a) What is a safety lamp? (b) Where and by whom should they be used?

Ans.—(a) A safety lamp is any lamp in which the flame is surrounded by a gauze or glass-and-gauze chimney in such a manner that it is completely isolated from the outside atmosphere surrounding the lamp.

(b) Safety lamps should be used at the working face and in all parts of a mine generating marsh gas in dangerous quantity. The condition of the mine with regard to dust, and the inflammability of the coal will determine the relative danger and the percentage of gas that may be considered as safe for open lights. In many bituminous mines 1 per cent. of gas, in the mine air at the face, would demand the use of safeties; while in hard-coal mines open lights are used with safety in 2 per cent. of gas; and $2\frac{1}{2}$ and even 3 per cent. cause no particular alarm, in many cases.

Safety lamps should only be intrusted to those fully acquainted with their use and who know how to handle them. A safety lamp is very unsafe when handled in gas by an inexperienced person.

IMPROPER USE OF SAFETY LAMPS

Ques.—What are the dangers arising from the improper handling and care of safety lamps by workmen?

Ans.—When a safety lamp is tipped or canted to one side so that the flame is directed toward the glass or gauze chimney, the glass may be cracked by the heat or the gauze become hot and the lamp pass flame. When the lamp is allowed to smoke continually or the gauze not thoroughly cleaned after each shift, or exposed to dust and dirt falling from roof and timbers, the mesh may become clogged so that the lamp is unsafe in gas. When a lamp is swung or allowed to fall or exposed to a strong current of air or the force of a heavy blast or carried rapidly against the air, the flame is liable to be blown through the gauze and ignite any gas that may be present. When a

lamp is improperly put together, or any of its parts omitted or the lamp not properly examined, cleaned and trimmed in the lamp room, there is danger in its use in gas. When a lamp is exposed too long to gas or is allowed to flame badly, especially if moved quickly at the time, the flame may pass through the gauze.

QUALIFICATIONS OF A FIREBOSS

Ques.—What qualities, moral, mental and physical, are or should be considered essential in a fireboss?

Ans.—The moral character of a good fireboss must be unquestionable; he must be sober, honest, conscientious and fully trustworthy. Mentally, he must be observant and possess good judgment, alert to what is going on about him and quick to decide and act. He must be physically strong and possess in a marked degree the senses of hearing, seeing and smelling.

SAFETY-LAMP SHIELDS

Ques.—What are the advantages of having safety lamps shielded?

Ans.—The shield of a safety lamp is a small piece of sheet metal attached to one side of the lamp to protect the lamp flame better against a strong air current. The shield is sometimes fixed, but more often is movable and arranged to slide up and down, according to need. It has the advantage of giving added protection to the lamp when required without obstructing all of the light. It is very useful when traveling an airway with an unbonneted Davy or other lamp. The bonnet of a safety lamp is sometimes improperly called a shield.

DANGER SIGNALS IN MINES

Ques.—When, where and by whom shall danger signals be used?

Ans.—The revised bituminous-mine law requires the fireboss to place a danger signal across the entrance to every working place or other place where explosive gas is discovered or any danger found to exist. The law requires that the superintendent furnish the signals, at the request of the mine foreman, and that they shall be uniform and of a design approved by the Chief of the Department of Mines and kept in good condition and distributed by the mine foreman or his assistant to points in the mine convenient for the use of the fireboss. Danger signals must be placed immediately on the discovery of the danger.

Inquiries of General Interest

All Questions Must be Accompanied by Name and Address—Not for Publication

Is Carbon Dioxide Blackdamp?

Will you kindly explain what carbon dioxide is, and whether it is the whole of blackdamp or only a part. Please explain fully, as this question is the result of a discussion of five first-grade mine foremen and three firebosses located at the Eclipse mine, Elco, Washington County, Penn. I have claimed that carbon dioxide is not blackdamp, but is a part of it. I am taking COAL AGE.

CHAS. C. CRAWFORD.

Newell, Penn.

In early mining, when little was known of the nature of mine gases, and much less of their properties and composition, miners called all mine gases by the general term "damps," derived from the German *dampf*, meaning vapor. Later, as the different natures of the gases became known, the terms "firedamp; whitedamp; blackdamp; chokedamp, or stonedamp; stinkdamp; afterdamp, etc.," came into general use by the miner.

Still later, as mining conditions have been carefully studied by chemists and other scientific men it has been found that what miners have been calling *firedamp* is any inflammable mixture of gas and air that gives a flame cap. Before the use of the Davy the cap was observed on the open candle flame.

What was called *whitedamp*, in the mines, was found to be carbon monoxide (CO). The term *blackdamp*, likewise, was found to refer to any unknown mixture of gases that dimmed or extinguished a light and caused headache, nausea or suffocation.

While this mixture generally consisted largely of carbon dioxide (CO₂), it was found, in many cases, to contain much nitrogen and naturally the oxygen content was below the normal percentage in air.

Mining textbooks, based largely on the early writings of Atkinson, Fairley and other pioneers in mining literature, have been prone to describe blackdamp as carbonic acid gas (carbon dioxide, CO₂). The error of calling blackdamp carbon dioxide is therefore pardonable; but in reality the term, as used in the mines, refers to variable mixtures of carbon dioxide, nitrogen and oxygen, the two last-named gases being a residual atmosphere resulting from the various forms of combustion (oxidation), both slow and rapid.

Use of Brattice Cloth in Mines

What is brattice cloth and how is it used in mines? Is it used as much in metal mines as in coal mines?

New York.

K. C. C.

Brattice cloth is any heavy canvas used as a curtain or a temporary wall or partition, in a mine airway or passage, for the purpose of directing the air current or deflecting it from its natural course, so as to ventilate certain rooms, headings, or void places that would not otherwise be reached by the air. The plain canvas or duck is frequently treated with tar, creosote or other preservatives to lengthen its life or render it incombustible. The canvas is furnished in rolls by mine-supply houses, or in larger quantities by commercial dealers in all kinds of asbestos cloths and packings, canvas, etc.

Brattice cloth finds its most important use in development work in mining, and in recovery work for reaching lost coal, or in mine-rescue work after a cave-in or an explosion. It is much used in driving prospect entries or headings or pushing rooms or chambers, for a time, ahead of the air.

The demand for brattice cloth is not as great in metal mining as in coal, only because the question of ventilation in metal mines is of minor importance. There is little or no gas, in these mines, that would prove a hindrance or a menace to the work.

Percentage of Grade

(a) I have two slopes, one dipping at an angle of 44 deg., and the other at an angle of 48 deg.; what is the per cent. of the grade in each slope? (b) How is the per cent. of grade determined for any angle of dip? (c) What is the angle of dip or pitch corresponding to a grade of 100 per cent.?

H. B.

Burgettstown, Penn., Dec. 4, 1911.

(a) The per cent. of grade, referred to the horizontal, in each slope, is as follows:

1. $100 \times \tan 44 \text{ deg.} = 100 \times 0.9657 = 96.57 \text{ per cent.}$
2. $100 \times \tan 48 \text{ deg.} = 100 \times 1.1106 = 111.06 \text{ per cent.}$

(b) The per cent. of grade, referred to the horizontal, for any dip or pitch, is always 100 times the tangent of the

angle of inclination. If, however, the grade is referred to the pitch distance instead of the horizontal, as is the custom of some engineers, in steep pitches, the sine of the angle of inclination must be used in place of the tangent.

(c) To find the angle of dip or pitch corresponding to a given percentage of grade, referred to the horizontal, divide the given percentage of grade by 100, and find the angle whose tangent is this amount. For example, the angle of inclination corresponding to a grade of 100 per cent., referred to the horizontal, is the angle whose tangent is $\frac{100}{100} = 1$, or an angle of 45 degrees.

Ventilation of Airway

In an entry 7 ft. 6 in. wide and 6 ft. 8 in. high, the air is traveling at the rate of 120 ft. in 12 seconds. (a) What is the quantity of air passing per minute? (b) If the water-gage reading is 2.5 inches, what is the horsepower on the air?

Pittsburg, Penn.

R. F. A.

(a) The sectional area of the airway is $7.5 \times 6\frac{2}{3} = 50 \text{ sq.ft.}$ The velocity of the air current is

$$\frac{120 \times 60}{12} = 600 \text{ ft. per min.}$$

The quantity of air passing is then $50 \times 600 = 30,000 \text{ cu.ft. per minute.}$

(b) The ventilating pressure due to a 2.5-in. water gage is $2.5 \times 5.2 = 13 \text{ lb. per sq.ft.}$ The horsepower on the air is then

$$\frac{30,000 \times 13}{33,000} = 11.818 \text{ hp.}$$

Weight of Motor Required to Haul Trip up Incline

What weight of traction motor will be required to haul a trip of 10 loaded cars, weighing 3 tons each, up a grade, the tangent of the grade angle being 0.02619, and assuming a coefficient of friction of 0.03, and a coefficient of traction of 0.18.

South Fork, Penn.

B. H.

The weight of the loaded trip is $10 \times 3 \times 2000 = 60,000 \text{ lb.}$; and the weight of the motor car required, under the assumed conditions, is calculated as follows:

$$W = \frac{0.03 + 0.02619}{0.18 - (0.03 + 0.02619)} \times 60,000 = 27,230 \text{ lb.}$$

Discussion by Readers

Comment, Criticism and Debate upon Previous Articles, and Letters from Practical Men

A Speedy Coal Dump

The readers of COAL AGE may be interested in the coal dumps much used in the Georges Creek field. The amount of coal dumped over them is remarkable. The dumping device, as shown in the illustration, consists of a movable platform which stops and supports the car as it tips over for dumping. There are two stationary guide plates on either side, outside the rails. These plates are of 3x1-in. iron, mounted on longitudinal timbers. Two lengths of 40-lb. T-rail are bent to form horns for engaging the car wheels on each side and just outside the

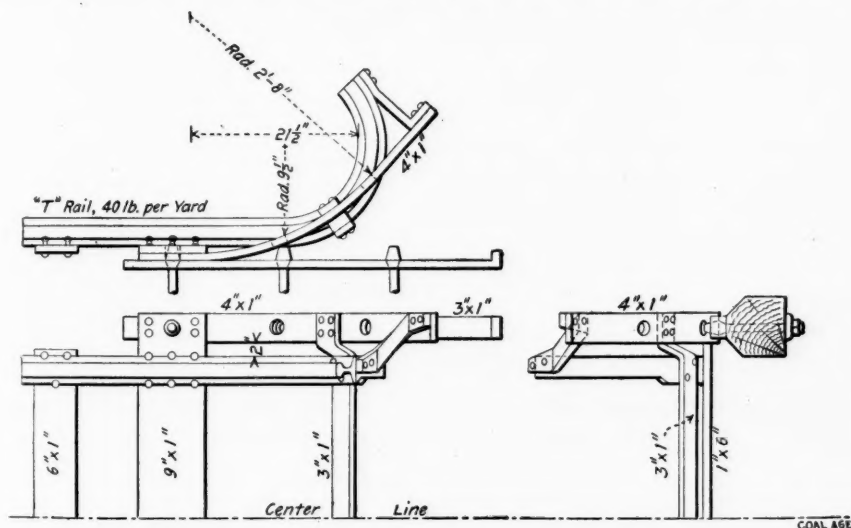
the dump has a capacity of at least 6000 long tons (6700 short tons) when the coal is kept ready on the sidetrack all day long. The following records have been made: Nine long tons per minute for 10 hours, 9¼ long tons per minute for two hours, 11 long tons per minute for one hour and 16.9 long tons per minute for short periods. The approaching grade is 3 per cent.

The mine cars, with normal topping, carry a net load of 2 tons 2 cwt. to 2 tons 6 cwt. (4704 to 5152 lb.) The dimensions of the cars are as follows: Length inside, 8 ft.; width inside at bottom, 25 in.; height inside, 2 ft. 10

most gaseous mine do not compare with that which would result from workings tapping a producing gas well.

It is even possible that a serious accident could happen in working a mine some distance away from a well due to gas escaping through cracks, crevices or fissures in the coal seam. I have known oil to seep through pillars of solid coal when the nearest well was from 50 to 80 ft. away. It is also reasonable to assume that when drawing pillars, cavities or reservoirs of gas are formed which any disturbance of the overlying strata may force out with disastrous results.

In development work, when approaching a gas well, a pillar of solid coal equal to one-third of the thickness of the overlying strata should be left for protection. In a mine, where pillars are being drawn, much more coal should be left



SPEEDY MINE-CAR DUMP USED IN THE GEORGES CREEK DISTRICT



TIPPLE IN GEORGES CREEK FIELD

rails, 1x4-in. roller bars are carried by the same plates, which act as spreaders for the rails.

In operation the carriage is held to its proper position by tapered studs which project from the guide plates and engage corresponding holes in the rollers. The force and the angle of the tip is so great that the car is pitched forward until the hind wheels leave the track, the car balancing on its front wheels. This complete tilt makes the car clean itself rapidly of all its coal.

The dumps are set close up to the switch of the track for empty cars, so that the car on being dumped immediately switches out of the way of the approaching loaded car. The distance of the heel of the rocker from the point of switch is 2 ft. 2 in. and the lead of the switch is 9 ft. 4 in. As much as 5403 long tons (6061 short tons) have been dumped in 10 hours over one tipple of this sort, and

in.; length over all, 9 ft. 6 in.; width outside at top, 36 in.; height over all, 4 ft. 4 in. Running to the dump at a good speed, they would jerk the tipple considerably were it high or long, but this is not the case at any of these tipples; they are all low and short. The tipple shown in the accompanying illustration (Elkhart mine) is in every way typical, though it happens to be one of the oldest in the district. I am indebted to R. A. Walter, chief engineer, Consolidation Coal Company, for this information and cut.

Chicago, Ill.

R. O. BURT.

Mine Workings Contiguous to Oil Wells

A gas or oil well may be considered one of the most dangerous features of its kind encountered in the operation of a coal mine. The ordinary dangers of the

and the same rule applies to a mine that is subject to a squeeze or creep. If the well is surrounded with old workings, I would suggest that a 12-in. hole be drilled into these workings at a distance not to exceed 15 ft. from the well; this will tend to relieve the rock pressure incident to the accumulation of any large reservoirs of gas. The pipes should be raised at least 10 ft. above the surface in order to allow any gas, which might be liberated from the workings, to readily escape.

No doubt we all can recall instances where havoc has been wrought in homes and business houses through a small leak in a gas line. So we can readily understand that it would not require the entire production of a gas well to cause a serious destruction of life in a mine. The gas pressure in houses varies from 2 or 4 oz. to 1 lb. per sq.in., while rock pressure, as recorded in wells in the McDonald and Oakdale oil and gas fields,

varies from 25 to 600 lb. per square inch.

The term rock pressure, as used in connection with oil or gas wells, signifies the force which the confined gas exerts in an effort to free itself. We have no guarantee that the casing itself will prevent the escape of gas, and even if it did, the life of the casing will not, in all probability, be equal to the life of the well.

To determine the size of pillars that may be depended upon, one must rely on his own personal observation and judgment. The following notes, however, should be carefully considered: (A) the thickness of the overlying strata; (B) the nature of this strata; (C) the character of the bottom; (D) the thickness and nature of the coal seam, whether hard and compact or soft and brittle, and (E) the inclination of the measures.

C. C. MAC. GREGOR.

408 Main St., Carnegie, Penn.

Narrow Work vs. Wide Entries—Relation to Operating Expense

I notice, in your issue of Dec. 23, page 354, a superintendent of mines, Marion, Ill., is interested in the opinion given relative to the driving of wide and narrow entries in mines; and the comparative expense of paying more yardage and getting less coal per yd. of narrow-work driven, or having to bear the lasting expense caused by roof falls and the timbering of wide entries, as long as the mine is a mine. Of course, much depends on the kind of roof you have to support. Some roofs will not allow you to drive anything but narrow entries.

I will state some facts that I have seen proven beyond a doubt, in regard to this matter. First, while top may be good at the start, it often gives way later, sometimes even years after the time of driving the entry. The cause may be due to a slight movement of the roof, owing to the removal of the coal in the rooms driven off the entry or the extraction of the coal in nearby workings. In some cases, there are peculiar roof conditions and the overlying slate or stone seems to give way suddenly from no apparent cause whatever.

Under such conditions as these, if the entries have been driven narrow, the expense of maintaining the entries is reduced to a minimum, as narrow-work always stands better than wide openings.

The Ohio-Valley coal seams are mostly all hard and the roof and coal, alike, are not badly affected by the action of air and moisture. Crossbars can be put overhead, in narrow entries, by hitching one end of the bar into the coal straight and making a sliding hitch for the other end. This method when it can be used saves much timber, as no legs, or only short ones at the most, are required for timber frames.

Narrow-work also does away with the heavy timbers that would be necessary on wide entries in order to avoid the setting of center posts in the entry, under the collars. Center posts not only increase the cost of timbering, but are dangerous to drivers and persons who must travel the entry. They are liable, also, to be knocked out and cause a heavy fall of roof in case a car jumps the track, which is by no means an uncommon occurrence in a mine.

My experience in overcoming a heaving bottom by driving narrow entries when opening a shaft mine, in a region new to me, at Cleaton, Ky., in 1905, was valuable. I found on investigation that quite a few of the mines in that region were troubled with heaving bottom, which necessitated the continual lifting of bottom on the roads and its removal from the mine. This work, in that region, was absolutely necessary.

It occurred to me that the difficulty could probably be overcome by driving only narrow entries with heavy entry pillars and making the room-necks about five times as deep as had been the custom there. The result of adopting this system was that I never had any heaving bottom. It saved the company many thousands of dollars. Another bad feature in regard to heaving bottom on entries is that it makes much mud in wet entries, and if the entry is dry it causes quantities of dust.

E. W. HOLT.

Central City, Ky.

Danger Periods in Mines

Regarding your recent editorial about "Danger Periods in Mines," will say that there are undoubtedly such periods both in a general and specific sense, but I cannot believe that seismic disturbances are responsible for the occurrence of mine explosions. It seems to me that the problem is perplexing enough without indulging in speculation as to whether the Courrières explosion caused the subsequent Formosa earthquake or whether the latter was responsible for the prior disaster in France.

I believe the reason why mine explosions, and especially dust explosions, are as yet so imperfectly understood is largely due to the fact that the laws governing them have not been established. A mine cannot be successfully ventilated unless the laws relating to mine ventilation are properly applied; neither can the danger from explosions be successfully averted unless the underlying principles regarding them are thoroughly known and understood. It may be said that dust explosions are erratic and subject to no law, but it can be readily proved that this is a mistake and that the occurrence and action of these explosions are controlled by well defined laws.

I do not know anything definite about conditions in the Briceville mine, but I

am confident you will find when all the facts are known that the mine was not only well ventilated, but that draft facilities in it were exceptionally good, highly favoring what Mr. Hall terms "the advance (of air and dust) toward the center of the disturbance." According to the brief statement in the Dec. 16 issue of COAL AGE it appears that the air shaft was located in an ideal spot on the summit, nearly in the center of the mine; the main entries for at least 4000 ft. were exceptionally high (8 to 14 ft.); while at least one other opening to the surface besides the main entries and air shaft is mentioned and probably others exist leading either to the surface or into adjacent mines. Furthermore, I think it will be found that butt entries were more or less connected by rooms being driven through and that butt headings, not connected with others or with the surface or adjacent mines, will be found the least affected by the explosion.

The facts regarding conditions in the Briceville mine will also show that the conclusions presented in my article on "Iowa Mine Explosions," which you expect to publish in one of your January issues, are fairly sound.

JOHN VERNER.

Chariton, Iowa.

[If Mr. Verner will read carefully paragraphs 5 and 6 of the editorial he will see that we have merely drawn attention to the periodicity of both these phenomena, and their clearly evident synchronism in numerous instances.—EDITOR.]

Danger in Gassy Mines

For the benefit of some of the firebosses, I send you the following note showing the danger that may be caused by sudden fall of roof or open door in a gassy mine.

Suppose, for example, there is a current of 50,000 cu.ft. of air passing per minute, in a certain section of a mine, and the safety lamp shows $\frac{1}{2}$ of one per cent. of gas on the return current, in this section. The quantity of gas given off is then $\frac{1}{2} (0.01 \times 50,000) = 250$ cu.ft. per min. Suppose now a door is left open on the airway, so as to short-circuit the most of the air-current; or suppose a cave-in occurs on the main intake, so as to block the circulation and reduce the current to, say 3000 cu.ft. per min. This will render the return air-current highly explosive, and only the prompt and decisive action on the part of the fireboss will avert a serious catastrophe.

Red Ash, Va.

A. T. WADE.

[The percentage of gas in the return air would be, in this case,

$$\frac{250}{3000} \times 100 = 8\frac{1}{3} \text{ per cent.}$$

which is not far from the maximum explosive point.—EDITOR.]

Coal Trade Reviews

Current Prices of Coal and Coke and Market Conditions in the Important Centers

General Review

The new year has opened with the coal trade stronger than it has been at any time during the present season. More seasonable weather has appeared and brought with it heavier domestic consumption and a general improvement all along the line.

The market in the East has been rather quiet as a result of the holiday cessation of the industrial plants. While not active it has, however, been steady, with heavy movements on contract, and some demand for spot. The possibility of a shut down next April is being already anticipated in some instances by storing. Colder weather is reported from the South but as yet not of sufficient duration to effect conditions or prices.

The middle West has experienced its first heavy blizzard of the season and there is a decided improvement in market conditions there. This trade has been on the verge of complete demoralization and the drop in temperature has appreciably strengthened the market, and checked any further shrinking in prices.

Trade in the Rocky Mountain states continues active and heavy tonnages are being moved. On the Pacific Coast the weather is mild and the market heavy.

New York

Business has not been as active this week as last. The market however, is steady as contract movement continues in excellent volume and although there is only a limited spot demand the tonnage moving on contract is sufficient to absorb the coal arriving at the piers without much delay. Railroad movement has been unusually prompt for this season of the year which has resulted in a good supply of coal at the piers so that shippers have been able to take care of their obligations with less difficulty than has often been experienced in the past, at this season of the year.

Strike talk is beginning to have considerable effect on consumers and shippers report that many of their customers are cognizant of the possibility of labor troubles in the spring and that those consumers who are in a position to stock up in anticipation of a suspension in the mining regions are making arrangements to store as much coal as is practicable.

Marine transportation is still short and vessel freight rates are up.

Spot prices for steam coal f.o.b. New York are unchanged from those reported last week, West Virginias being quoted at about \$2.40; ordinary Pennsylvanias \$2.55@2.65; best grade Pennsylvanias \$2.80@2.90. No accumulations at the piers of demurrage coal are reported.

Hampton Roads, Va.

The year closed at Hampton Roads unusually active in the coal business. Never in the history of the port has there been so great a tonnage put over the three coal piers. In round figures it may be reliably stated that ten million tons have been dumped at Hampton Roads during 1911. Official figures place it at 9,981,431 tons, divided among the three railroads as follows: Norfolk & Western, 4,393,353; Chesapeake & Ohio, 3,585,592; Virginian, 2,002,486. The optimism does not cease here, but it is predicted by those in close touch with large interests in the coal business that this figure will be boosted to 15,000,000 tons within the next three years. The exporting of coal from this port has risen from the experimental stage and is today a factor worthy of serious consideration. The prospects along this line for 1912 are unusually bright.

Owing to the customary let-up in mining in the New River Pocahontas fields between Christmas and New Years, the tonnage moving to tidewater is rather light. Nevertheless, the heavy shipments made in anticipation of the shut-down during the holidays is arriving and is being promptly dumped. There is practically no free coal at Hampton Roads this week, but that on hand is more evenly divided than it was last week. Prices are firm, possibly the best they have been throughout the year. Vessels appear to be more plentiful and rates are some easier.

Louisville, Ky.

This vicinity was visited by a belated cold snap within the past few days and, as a result, there is a better feeling among the dealers. Retail business improved, to an appreciable extent, although the increased trade was not sufficient to cause any change in the prices, which have prevailed locally for about three weeks. As it looks now, there will be little change before March, when

a drop will come. In Louisville, and throughout Kentucky and southern Indiana the worst winter weather comes usually after Jan. 1. As a rule, however, most of the coal is ordered in advance of the new year, at the prices prevailing when the orders are given, and this accounts for the quotations fluctuating but little during January, February and early March.

One dealer is quoting Bannar lump at \$3.25 per ton of 2000 lb. New River smokeless is quoted at \$4.50 per ton and Pocahontas smokeless at \$4.75. Reports from the mines are rather pessimistic, the producers insisting that the demand is not nearly what it should be at this time, and the prices hardly as good as last year.

Nashville, Tenn.

There is practically no change in the coal situation in this district. The usual dullness prevailed over the holidays, which together with the spring weather, made everything extremely quiet, although there is a good demand for screenings, which is always the case when orders are slack on domestic lump.

Prices are unchanged, as most of the shippers realize that cutting in order to get business, accomplishes little. It does not help moving the coal and has a tendency to place prices back to a low level.

The strike situation for the coming spring is being watched closely over the nonunion field, for it takes just such conditions as this every two years to keep a great many of our mine operators from going into bankruptcy.

Prices as quoted by the majority of the operators at present are as follows per short ton: 2½-in. lump, \$1.50; nut, \$1@1.10; pea and slack, 30@35c.; mine-run, 90c.@\$1.

Chicago

An upward trend is noticeable in the Chicago market. A cold wave, accompanied by snow and a general cleaning up of surplus stock, have tended to strengthen the position of coal dealers and to check the recent fall in prices.

A closing down of the Illinois mines for several days also had its effect. Smokeless coal, which was at 80 to 90c. for mine-run, is now established on a basis of \$1, and higher prices are looked for. Some observers predict that the same price for mine-run as is being obtained in the East—\$1.20—will soon be secured. Lump and egg is firm at \$1.75.

Prices direct from the mines in net tons to retail dealers and steam users on spot shipments are as follows:

Sullivan County	Chicago	F.o.b. Mines
Domestic lump....	\$2.35@2.50	\$1.50@1.65
Egg.....	2.30@2.40	1.45@1.55
Steam lump.....	2.10	1.25
Screenings.....	1.37@1.52	0.50@0.65

Springfield		
Domestic lump....	2.07@2.32	1.25@1.50
Steam lump.....	1.92@1.97	1.10@1.15
Mine-run.....	1.82@1.87	1.00@1.05
Screenings.....	1.32@1.42	0.50@0.60

Clinton		
Domestic lump....	2.12@2.27	1.35@1.50
Steam lump.....	2.00@2.20	1.25@1.45
Mine-run.....	1.82@2.02	1.05@1.25
Screenings.....	1.42@1.52	0.65@0.75

Poahontas and New River		
Mine-run.....	\$2.95@3.05	\$0.90@1.00
Lump and egg....	3.65@3.90	1.60@1.85

Coke—Coke is quoted at: Connells-ville, \$4.50@4.65; Wise County, \$4.50@4.65; byproduct, egg and stove, \$4.95; byproduct, nut, \$4.55@4.65; gas house, \$4.85.

Minneapolis—St. Paul

The coal business this past week has greatly improved over the previous weeks of this month. The weather turned cold, beginning on Christmas day, and has been hovering around the zero mark all week, ending with a good old-time blizzard. Abundant snow has fallen and has changed the Indian summer into real winter. Better sleighing could not be wished for. Wholesalers claim that the reason domestic trade from the country has been so slow this month is due to the fact that the dealer has been well stocked up, and, that the farmer has not been able to haul any coal home with him on his return from town, owing to the bad condition of the roads.

During the last week in December the average maintained was as much as any week during the record-breaking month of November. This indicates that the weather was largely responsible for the heavy movement into the country during that month. It is quite probable that the final figures will show that the tonnage for December, 1911, will be greater than for the same month in 1910, although the shipments will be less than for November. Dock men report that about 40,000 carloads of coal were removed from the head of the Lakes last month, and it is not probable that the December shipments will exceed 30,000 carloads. From now on till spring the market in this territory will be a weather proposition.

Prices on mostly all grades of coal have stiffened up and with continued favorable weather there is no reason why list prices should not prevail. Youghiogheny dock screenings are scarce, only two or three docks reporting any supply. Illinois prices are a great deal better than formerly. The dealer trade in the Twin Cities is reported as good and retailers are rushing out all orders while the sleighing is favorable, as teams are not any too plentiful.

The new briquetting plant of the Berwind Fuel Co., at the head of the Lakes, will soon be in operation and shipping briquets. They are also building an extension to their dock, which will give it a storage capacity equal to any of the other docks.

St. Louis, Mo.

With the first of the year came a change for the better in St. Louis prices. As a matter of fact, the demand has been considerably better than several anticipated, both for the city and country. A great many of the stocks that were run down are being replenished, and factory stocks that were slim, on account of the year-end inventory, are being laid in to the fullest capacity.

However, with this increased demand prices are not what they should be under present conditions. Two years ago this time, with the threatened strike, lump coal of Cartersville grade sold for \$2 per ton.

The chances are, however, that from this time on the coal market will continue to improve unless abnormal conditions set in. The winter thus far has been rather open and predictions are that from now on the weather will be more severe, and this, of course, will stimulate the demand. St. Louis prices are:

Franklin County	
Lump and egg.....	\$1.40@1.50
No. 1 nut.....	1.25@1.35
No. 2 nut.....	1.20@1.30
No. 3 nut.....	1.05@1.15
2-in. screenings.....	0.65@0.75

Cartersville	
Lump and egg.....	\$1.25@1.35
No. 1 nut.....	1.15@1.20
No. 2 nut.....	1.05@1.10
No. 3 nut.....	0.90@0.95
Screenings.....	0.60@0.65
Mine-run.....	0.95@1.00
No. 1 washed.....	1.60@1.75
No. 2 washed.....	1.30@1.40
No. 3 washed.....	1.20@1.30
No. 4 washed.....	0.80@0.85
No. 5 washed.....	0.40@0.45

Standard	
6-in. lump.....	\$0.95@1.00
2-in. lump.....	0.90@0.95
3x6-in. egg.....	0.80@0.85
No. 1 nut.....	0.70@0.75
No. 2 nut.....	0.60@0.65
Screenings.....	0.40@0.45

Mt. Olive	
6-in. lump.....	\$1.35
3-in. lump.....	1.25
3x6-in. egg.....	1.00
No. 1 nut.....	\$0.85@0.90
No. 2 nut.....	0.75@0.80

There are no other coals coming into the market from the Illinois field, with the exception of Big Muddy, which is strong at \$2.20 for 6-in. lump. High-grade coals from the inner district, such as Trenton, etc., are in good demand at about \$2 per ton. Since the first of the year there has been a fair demand for anthracite of all sizes, principally chestnut, at the current circular.

There is also an increased demand for smokeless, which retails lump and egg at \$6, f.o.b. bins, St. Louis. A fairly good volume of byproduct and gas-house coke is moving at \$4.75 for the byproduct and \$4.65 for gas house.

Spokane, Wash.

The prices for coal in Spokane and the surrounding territory have remained unchanged during the past week, and all indications are that there will not be any material changes until spring. The prices for the week ending Dec. 27 are as follows:

Kind	Wholesale	Retail
Rock Springs.....	\$7.20	\$9.00
Owl Creek.....	7.20	9.00
Kirby.....	7.20	9.00
Carney.....	6.70	8.50
Bearcreek.....	6.35	8.25
Roslyn steam.....	5.25	6.25
Canadian steam.....	5.25	6.25

The cold snap, which has been prevalent for the last week, is drawing on the supply of coal in the local yards, but the supply is being continually replenished by shipments from the Canadian mines, and is equal to any demand that might come.

Portland, Ore.

Christmas trade was fine in all lines excepting fuel and the reason for the poor fuel trade was mild weather. Coal dealers look for no great volume of business until colder weather sets in. January, February and March are the coldest months in this territory. It is expected, however, that if cold waves sweep over the country for a couple of weeks during these months the rush for fuel will be so heavy that it will be difficult to fill orders promptly. The mild weather, while not making a heavy demand on the fuel stocks, has a tendency to make people forget that colder weather may follow and if it comes suddenly many will find their supplies short. A large number live here as in many of the larger cities, from a paper bag.

Foreign Markets

GREAT BRITAIN

The labor outlook is regarded with much anxiety in view of the ballot of members of the Miners' Federation, of Great Britain, to be taken about Jan. 10. If further efforts to effect a settlement prove abortive and the result of the ballot is favorable to a strike, the men are to come out at the beginning of March, provided they observe their contracts and give one month's notice.

With the Xmas holidays at hand, the market is very quiet. Quotations are approximately as follows:

Best Welsh steam coal.....	\$1.20
Seconds.....	1.02
Thirds.....	3.75
Best dry coals.....	4.02
Best Monmouthshire.....	3.75
Seconds.....	3.60
Best Cardiff small coal.....	2.16
Seconds.....	1.92

The above prices for Cardiff coal are all f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both exclusive of wharfage and for cash in 30 days, less 2½ per cent. discount.

Coal and Coke News

From Our Own Representatives in Various Important Mining Centers, Affecting the Coal Industry

Washington, D. C.

An important joint meeting of the American Economic Association and the American Association for Labor Legislation was held here on Dec. 30, 1911, during sessions of the conventions of the two bodies. The U. S. Bureau of Mines had prepared an exhibit of mine rescue apparatus containing the familiar equipment usually on view at the Bureau of Mines itself and this was available for the inspection of the members and guests.

Secretary Fisher opened the meeting with a general discussion of the conditions under which the Bureau of Mines has been organized and the work it is attempting to do. He outlined the policy of the United States with respect to mining and the safety of miners in substantially the same way that he has on former occasions. Ex-President John Mitchell of the United Mine Workers who had been expected, was unfortunately detained away so that his address was not presented.

DISEASES OF THE MINE

Dr. S. C. Hotchkiss discussed the general subject of occupational diseases, gave the results of work he has been doing for the Bureau of Mines on that topic, and reviewed such questions as diseases of the lungs due to damp and cold, and diseases like the hook-worm malady due to the presence in the soil of parasites which are probably propagated by faulty methods of disposing of excreta, etc. He then turned to the question of preventing such diseases and showed what had been done in Europe and what might be done here.

Dr. Holmes gave an interesting outline of the work of the Bureau of Mines and pointed out the particulars in which there should be an extension of activity. He said that the Bureau of Mines has been in existence one and one-half years. During that time its most important work has related to the causes and prevention of coal-mine disasters. This work concerns some 30,000 coal-mine officials, and more than 700,000 coal-mine workers, the majority of these latter being unfamiliar with the language, the laws, the institutions, or the policies of this country.

AN INTERSTATE MINING COMMISSION

Dr. John H. Haynes, of Los Angeles, in his address, urged the establishment of an Interstate Mining Commission with power to enact and enforce regulations for the protection of the 700,000 coal

miners now working in the privately owned coal mines of the United States, and to have direct charge of the coal lands owned by the nation, whether operated by the government or under private lease.

He showed that the national regulation in European coal mines had enormously reduced the percentages of fatalities in the last 18 years: in Prussia from 2.54 deaths annually per 1000 miners employed, to 1.94; in Great Britain from 1.49 to 1.29; in France, from 1.07 to 0.84; in Belgium, from 1.40 to 0.94; while under state regulation in the United States during the same period, the rate has steadily increased from 2.67 in 1895 to 4.86 in 1907.

The death rate in the several states, too, has varied all the way from 2.25, the average rate in Illinois for a term of years, to the frightful figures in the case of Colorado for the year 1907, when 21 out of every 1000 miners lost their lives in the single year, more than 20 times the rate of fatality for Belgium or France.

STATE VS. FEDERAL CONTROL

Continuing, Dr. Haynes said that the national government has saved the lives of thousands of railroad employees by enforcing the use of automatic couplers and other safety appliances; why should it not protect the lives of coal miners by enforcing in the case of mines producing coal for interstate markets such regulations as have been proven efficient in the saving of life? State regulation has failed woefully in the past; and it is altogether unlikely that it will improve in the future, for the following reasons: 1. Each state fears to impose regulations upon its own coal operators more burdensome than those to which their competitors in other states selling to common markets are subjected. 2. Each individual state cannot for itself make the scientific investigations, or maintain a body of experts, of the efficiency easily attainable by the national government. 3. State inspectors owing to political influences are notoriously less efficient than federal inspectors.

According to Dr. Haynes three European experts, invited by our national government to inspect our mines, agree that American mining, now so fatal, can be made as safe as any in the world, and at a small increase, if any, in the cost of production. Even if the last statement is called in question by coal producers, no broad minded and humane

operator will object to efficient safety regulations, provided, of course, they shall apply equally to all of his competitors, including those of other states; so that the increased cost of production, if any, can be charged up to the general cost and added with other expenditures to the sales price.

Alabama

Birmingham.—The Pratt Consolidated Coal Co., with headquarters in Birmingham, will open an office in Mobile about Jan. 1. This company is one of the largest coal companies operating in the South, owning its mines and having a capacity of 10,000 to 12,000 tons a day. Offices have just been opened in Pensacola, Fla., also. The purpose of the establishment of these two branch offices is to develop the bunker and export coal business. The step is regarded as significant of the bearing that the opening of the Isthmian Canal is expected to have on the Alabama coal trade.

It is the general understanding that the underwriting of \$2,600,000 of the proposed bond issue for the merged Alabama Coal & Iron Co. and Southern Iron & Steel Co., has been definitely arranged for, and that the way is now comparatively clear for the early announcement that the merger and reorganization plan is in effect. This will probably come when Cecil Greenfell returns from England.

Colorado

Denver.—A plan to unionize the 200,000 miners of Mexico was considered by the executive committee of the Western Federation of Miners which met here Jan. 4.

If the state land board incorporates a clause in its coal leases that was discussed recently and probably will be adopted, all danger of any combination of coal operators controlling the price of coal in the state will be forever done away with, for the clause will provide that the lessee shall sell all coal mined from state land at a certain price. With thousands of acres of coal still in possession of the land board, this clause will be sufficient to regulate the price of coal in every industrial center in Colorado.

Walsenburg.—The reports that a strike is imminent in the southern coal district are branded as being absolutely

false by B. P. Manley, of the Colorado Fuel & Iron Co. in a recent interview.

Central City.—The coal dealers of Central City and Black Hawk are unable to get any coal from the Routt County fields, claiming that the Colorado & Southern R.R. will not bring up coal delivered to it by the Moffat road. Several cars have been turned over to the Colorado & Southern road, but that road has ordered them returned.

Illinois

Springfield.—Turning out 4,200 tons of coal a day, a force of 500 miners employed in mine No. 3 of the Superior Coal Co. at Bend, is straining every minute of the day to maintain that average and beat the record of a same amount for 13½ days held by miners of the Livingston mine at Livingston. The record established by the Livingston miners was made recently when for 13½ days the output of the mine averaged 4,200 tons a day. The Superior mine is one of the best equipped in the state and the miners are confident of being able to beat the record.

Returns from the recent state election of the Illinois Mine Workers indicate that John Walker of Danville has been returned to the presidency of the organization by a large majority over Groce Lawrence of Herrin and Joseph Pope of Belville.

The new coal washer which the Chicago, Williamson & Vermilion Coal Co. has been building at Thayer is now completed and will soon be put in operation.

Peoria.—The state mine inspector has strongly advocated a yearly service for the Fulton County mine inspector, because of the extent to which coal interests in this county have developed.

Belleville.—Work has been resumed by the Star Coal & Mining Co. and the St. Clair Coal & Mining Co., which operate mines south of Belleville. Both mines will employ a full force of men.

Edwardsville.—Parties whose identity has been concealed have been making large purchases of coal lands northeast of Edwardsville. Recently options on 2300 acres in Olive Township, Madison County, were closed. All the land lies at the junction of the Illinois Central and Chicago & Eastern Illinois tracks.

Indiana

Terre Haute.—Attorneys of the counties within the Indiana coal field have decided to appeal to the United States Supreme Court from a decision of the Indiana Supreme Court which held that the law imposing a tax on unmined coal is invalid.

The Indiana Coal & Land Co. recently filed options on about 500 acres of land in Otter Creek township. The price to be paid is \$50 an acre if the options are followed by purchase of the coal rights.

Indianapolis.—In an effort to obtain a reduction in the price of anthracite coal, J. V. Zartman, secretary of the Indiana Manufacturers' and Shippers' Association, has authorized Alexander G. Cavins, attorney for the association, to file a petition with the interstate commerce commission attacking the freight rate on anthracite shipped from the Pennsylvania field to Indianapolis.

Brazil.—The American Coal Co. with headquarters in Brazil, has been buying land and taking options in the vicinity of Bicknell through its representative, Dr. Asbury of Clay City, until now it controls nearly everything between that city and the Baltimore & Ohio Southwestern R.R. at Wheatland. Most of this distance of about eight miles has been leased, but under some of the farms the coal has been purchased outright. As fast as the options expire they are renewed. The coal company will begin sinking a shaft on these lands early in the spring.

Kansas

Mineral.—It is rumored, from a reliable source, that the Mayer Coal Co. has purchased 120 surface acres and 200 acres of coal in what is known as the Wisewell tract a half mile northwest of town and near Mayer shaft No. 6. It is said the money consideration was \$32,000.

Kentucky

Whitesburg.—It is given out in railroad circles that the Chesapeake & Ohio has completed arrangements for the early construction of a 25-mile branch line of road from Harold, on the main line of the C. & O., up Beaver Creek to the border of Letcher and Knott counties, to tap a rich coal and timber district owned by the Consolidation Coal Co., the Beaver Creek Coal Co. and the Northern Coal & Coke Co.

Seabee.—The sale of the mining property and coal rights of the Southern Coal & Transportation Co. at Robards was held by the Master Commissioner of Henderson County on Jan. 1. The coal and coal rights under 85.46 acres in Webster County and the surface coal and mineral rights under 64 acres in Henderson County and the coal and mining rights only under 7796 acres in Henderson County were sold.

The Kentucky River Consolidated Coal Co., composed of eastern capitalists, owning some 50,000 acres of choice coal and timber lands in southern Letcher and Perry Counties, along the line of the

Lexington & Eastern R.R., makes the announcement that it will soon take steps looking to the development of the property. It will be necessary to build spurs out from the Lexington & Eastern R.R. to reach the property.

Barbourville.—The Harlan Town Coal Co., which is preparing to operate a mine on its property about a mile east of Harlan, in Harlan County, will soon have a town of its own in Kelly Bottoms. Many houses are already completed and others are going up or are contracted for.

Harriman.—The Harriman & Morgan R.R. Co., recently chartered, has elected officers as follows: C. E. Hendrick, president; J. N. Baker, vice-president; Robt. B. Cassel, secretary and treasurer. Indications are that this road is to be built north from this city and will tap new and rich coal fields in the Lone Mountain and Brimstone Mountain sections of Morgan and Scott Counties. It is backed by the same interests that have constructed the Harriman, Knoxville & Eastern from here to Oliver Springs.

Missouri

St. Louis.—The supreme court of Missouri has just handed down a decision which is of far more than local interest. When Gov. Hadley was attorney general of the state he instituted suit against the Missouri Pacific R.R. for violating that section of the state constitution which forbids a corporation from engaging in business other than that expressly authorized in its charter. Now Missouri's highest judicial tribunal decides that a railroad has a legal right to own coal mines or stock in coal mining companies, for the reason that "coal is necessary in the operation of trains." The court adds that "no one could contend for a moment that a railroad cannot buy a mine and dig its own fuel supply."

Moberly.—It is reported that Mine No. 11 of the Northern Central Coal Co. at Higbee, that some time ago sustained a great loss by fire will again be ready for operation in a month's time.

Ohio

Columbus.—Charges of discrimination in coal carrying rates were made Dec. 26 to the Ohio Public Service Commission by the Central Ohio Operators' Association against the Baltimore & Ohio and the Pennsylvania railroads. The association alleges that the tariffs of those roads for coal carrying from the Tuscarawas district are unjustly discriminatory and asks that the commission investigate at once and compel a readjustment.

Suit to foreclose a blanket mortgage for \$834,500, given in July, 1901, was brought in the United States court Dec. 27 by the Bankers' Trust Company of

New York against the Pittsburg, Wheeling & Lake Erie Coal Co., the Wheeling and Lake Erie Coal Mining Co. and M. A. Hanna & Co., consisting of Dan R. Hanna, Robert L. Ireland and Matthew Andrews of Cleveland. The mortgage was given on 16,000 acres of Jefferson County coal lands and \$200,000 was to have been paid by July, 1911. The Bankers' Trust Company asks that the Jefferson County property be disposed of to satisfy its claim.

Cincinnati.—The American Briquetting Co., which is a \$1,250,000 Arizona corporation, was organized at Dayton, Ohio, recently, with C. L. McCrea, of that city, president and Thomas R. Morgan, of the Pocahontas Coal Co. here, as vice-president. The company will convert the lignite deposits of North Dakota into fuel briquettes at a plant to be built at New Salem, N. D. H. H. Hayes, the local representative, says that the company can produce the briquettes at \$3.50 a ton at the mines, and will cut the retail price of coal in half in the Northwest.

Wellston.—An excellent grade of No. 2 coal, 3½ ft. thick, has been discovered on the Kessler farm, near Hawkes Bridge, east of here. A favorable report having been received from the chemist to whom the samples were sent for analysis a shaft will be sunk to the coal, with a view to placing it on the market.

Pennsylvania

(BITUMINOUS)

Bellefonte.—The coal mining operation of Atherton & Barnes, at One Mile Run, one of the most important in that section, has resumed work after a prolonged idleness. Upward of 150 men are again given employment.

Altoona.—Supreme Court Justice Bijur of New York has vacated an injunction obtained by the James Kerr Securities Co., holder of \$500,000 bonds of the Pennsylvania Coal & Coke Co., to restrain the reorganization committee from executing a lease of the company's coal lands.

Indiana.—Development of the Brush-valley field which runs along the Blacklick near Josephine does not now seem as near at hand as it did a short time ago. Upward of \$30,000 have been expended during the past year in drilling and prospecting and the tests have proved the coal to be some of the best in Indiana County. The sudden halting of proceedings is causing much comment, but several of the owners of the land, take the matter optimistically and fully expect final developments within a short time.

California.—Three men were burned to death in a poolroom and rooming house, at Daisytown, a mining hamlet, near here at midnight, Dec. 29. The men

were employed by the Monongahela River Consolidated Coal and Coke Co., at Daisytown.

Latrobe.—Two miners are dead and four persons injured as the result of a dynamite explosion in a miners' boarding house near New Derry, Dec. 25. One miner, was blown to atoms. The explosion shook the town and was heard for several miles.

ANTHRACITE

Scranton.—Reduced freight rates on coal from the mines to points in New York state are scheduled to go into effect Jan. 20 on the Lehigh Valley, Philadelphia and Reading, and Delaware, Lackawanna & Western. Rates were reduced on the New York, Ontario and Western, Dec. 15, 1911.

Wilkesbarre.—For fear of damaging the county court house and the residences along the banks of the Susquehanna River, Mayor John V. Kosek has vetoed a bill introduced in Council to sell the coal underlying the river common.

Employees of the Hadleigh colliery of the Pittston Coal Co., at Sugar Notch, went on strike recently because they were paid by check instead of in money. Sugar Notch has no bank and the checks caused the men considerable inconvenience.

Pottsville.—The drainage tunnel which was begun nearly three years ago by the Lehigh Coal and Navigation Co., at a point a short distance above Nesquehoning Junction, and has been driven from there in a southwesterly direction, will soon reach No. 1 shaft above Nesquehoning, four miles from the beginning. Two sets of men are working toward each other, one from the entrance and the other from No. 1 shaft, and it is said that they are now only about 800 ft. apart.

Shamokin.—Preparations are now under way by the Philadelphia and Reading Coal Co. for driving a tunnel to cut the rich Buck Mountain vein, at the "Horseshoe" curve, near Glen Carbon. The Reading company has extensive coal operations all through that valley and the vein has been proven and followed for several miles east, along the Broad Mountain, showing a profitable thickness. The mammoth vein is to be worked from this locality as far as Frackville, a distance of eight miles.

Tennessee

Knoxville.—The regular monthly meeting of the Southern Appalachian Coal Operators Association was held Dec. 22. A feature of the meeting was a paper and discussion on workmen's compensation for accidents. The actions of certain law firms in connection with the recent Briceville disaster were vigorously denounced.

Texas

Strawn.—After a suspension of work for nearly six months, the Mt. Marion Coal Mining Company has resumed work.

Utah

Salt Lake City.—The Elk Coal Co., a Carbon County concern, which recently went into the hands of assignees, will probably be reorganized, according to an announcement made by the stockholders' committee, which has been investigating the company's affairs. The raising of \$300,000 is contemplated to satisfy certain claims, and of this about \$100,000 has been secured. The property is estimated to be worth several times the amount of the indebtedness. George Buckley, E. A. Lesser and L. Walker form the committee, which is looking after the interests of the stockholders.

Virginia

Bristol.—The Virginia Iron, Coal & Coke Co., which has two large plants in Bristol, has made the largest coal contract ever made by a southern mining company. It has contracted to furnish the Boston & Maine R.R. with 66 cars of coal per day, for a period of five years. The amount involved is in excess of \$9,000,000. Under the terms of the contract the coal is to be delivered to the tracks of the Boston & Maine R.R. in the city of Boston. The coal will be mined in what is known as the Toms Creek mines of southwest Virginia and will be shipped out over the Virginia & Southwestern and Norfolk & Western. This coal has heretofore been supplied from western Pennsylvania.

West Virginia

Morgantown.—The entire 200 ovens belonging to the Preston County Coke Company at Cascade are now in blast and the plant is working at full capacity. One hundred of the ovens have been fired during the past two months and between 300 and 500 men are now given employment.

There has been little change in the operations of the Elkins Coal & Coke Co. since No. 6 mine was opened.

Wheeling.—Ejectment proceedings involving more than 1000 acres of coal land in Webster and Randolph Counties recently came up before the United States circuit court of appeals. The Upper Elk Coal Co. and Christian Seybold both claim to own the property.

Weston.—Dr. D. P. Kessler is having a coal tipple built at his mines at Arcola and is making preparation to ship coal at an early date.

Canada

Montreal—The Dominion Coal Co. predicts a big increase in the output for 1912. Mr. Alexander Dick, the general sales agent says: "If everything turns out as we expect during the season of 1912, we will have a record-breaker, as the output will not be less than 4,000,000 tons, or a half million in excess of this year's figures." He also reports an improved situation at Springhill, where the output is between 30,000 to 35,000 tons a month, or around 400,000 tons a year.

Twenty-seven independent coal-mine operators of Alberta and eastern British Columbia voluntarily increased the wages of their workmen by 8 per cent., on Dec. 21, thus bringing the scale up to that of the mines employing union labor.

England

London—The miners' federation has decided to take a vote on the question of national stoppage of the work in the mines, based on the question of a minimum wage. If a two-thirds majority of the members of the federation vote to stop work, the strike will be ordered for the end of February.

Another evidence of the labor unrest in the United Kingdom was manifested recently when 200 colliers, employed in the mines at Treorchy, Wales, went out on strike as a protest against the employment of non-union labor.

Personals

Frederick Gillmore, until recently with the Gulf Transit Co., has been given charge of the new branch office of the Pratt Consolidated Coal Co. at Pensacola, Fla.

C. M. Riker, formerly manager of the West Kentucky Coal Co. has been appointed assistant to W. B. Kennedy, president of the Nortonville Coal Co. at Nortonville, Ky.

Bart Murphy, for 20 years in the employ of the H. C. Frick Coke Co. and for a number of years foreman at the Standard shaft, has accepted the position of general inspector for all the mines of the Rainey Coal & Coke Co.

John Randolph Haynes of Los Angeles was recently appointed special commissioner, representing California, by Governor Johnson, for the purpose of investigating coal mines, and especially coal mine accidents throughout the United States. The commission issued by the Governor will furnish a sufficient entrée for Mr. Haynes in carrying on his investigations, and he will prepare a detailed report on the subject.

A committee of prominent mining and electrical engineers, which has been engaged in studying mining conditions in

England, Germany and other countries, conferred recently with the officials of the Bureau of Mines, at Washington, D. C. Members of the committee are George S. Rice, chief mining engineer of the Bureau of Mines; Erskine Ramsay, of the Pratt Consolidated Coal Co., of Birmingham, Ala.; A. B. Jessup, of the Lehigh Valley Coal Co., of Wilkes-Barre, Penn.; H. M. Warren, of the Delaware, Lackawanna & Western R.R. Co., of Scranton, Penn.; G. B. Hadesty, of the Philadelphia & Reading Coal & Iron Co., of Pottsville, Penn., and John Bart, of the Berwind-White Coal Co., of Windber, Pennsylvania.

Obituary

George M. Davis, aged 67, one of the best known coal men in western Kentucky, died, recently, at his home, in Madisonville. Mr. Davis was manager of the St. Bernard mines, at Morton's Gap.

Capt. Levi Rinehart Doty, aged 64, for many years one of the best known men in Columbus, Ohio, died recently in Chicago, where he has been located for the past year. Capt. Doty was engaged in the coal business for nearly a third of a century. He served as president of the former New England Coal Co. and of the Northern Fuel Co., and also for a time as vice-president of the Pittsburg Coal Co. He was president of the National Tripoli Co. When he left the coal business, he became associated with the Ralston Steel Car Co. and for a year has been interested in the manufacture of cars at Chicago.

Industrial Notes

Announcement is made of the organization of the Bonnyman-Norman Coal & Iron Co., of Birmingham; James Bonnyman, president; James A. Norman, vice-president; A. H. Andrews, secretary. The new company will be the sales agent for the Brookside-Pratt Mining Co., and will handle coal and coke, and other industrial products in which the officers of the concern are interested.

The Ridgway Dynamo & Engine Co., Ridgway, Penn., announces the opening on Jan. 1, 1912, of a new district office in Room No. 1417, Oliver Building, Pittsburg. This move has been made in order that the company may better serve its many friends in the district and to facilitate the handling of its various well known lines of steam engines and electrical apparatus. J. F. Rodgers, who is a native of Pittsburg, and enjoys a wide acquaintance among the mine, mill and manufacturing interests of the city and vicinity, has been secured as local manager. Mr. Rodgers will be glad to welcome his friends and all friends of the Ridgway Dynamo & Engine Co. at its new office and to render any possible service on its behalf.

New Publications

FOURTEENTH ANNUAL REPORT OF LABOR STATISTICS FOR THE STATE OF VIRGINIA, 1911. 193 pp., 6x9¼ in. Public Printer, Richmond, Va.

Coal and coke production statistics are accorded three pages.

TECHNOLOGY AND INDUSTRIAL EFFICIENCY. Proceedings of the Congress of Technology, 1911. 486 pp., 6½x9½ in., illustrated. \$3. McGraw-Hill Book Co., New York.

Some 70 pages are included in this volume and in all form a valuable and up-to-date record of the present state of industrial science as well as a presentation of some of its problems and their probable solutions. The six sections into which the congress was divided are represented by papers on: "Scientific Investigation and Control of Industrial Processes," "Technological Education in its Relations to Industrial Development," "Administration and Management," "Recent Industrial Development," "Public Health and Sanitation," "Architecture."

ELECTRICAL ACCIDENTS IN MINES. THEIR CAUSES AND PREVENTION. Miners Circular 5. By H. H. Clark, W. D. Roberts, L. C. Hsley and H. F. Randolph, 3 illustrations, 16 pp., octavo. Government Printing Office, Washington, 1911. Free on request.

It is a pleasure to commend this little booklet on the avoiding of electric shock and on the rescue work in connection therewith because we are sure that of all the people who have read and will read it, the authors will be the least appreciative. It is a book such as no technical men, immersed in advanced studies desire to write, but which they only undertake because they know that such books are needed by a public which cannot study and know the subject in a technical way. The authors are to be congratulated on the simplicity of their language, on their selection of essentials and on the fact that they have managed to write down a lot of practical information in a manner that will not fail to be of value to every miner or mine official who may read it. The booklet is for free distribution on request.

Trade Publications

Hyatt Roller Bearing Co., Newark, N. J. Catalog, Section No. 604D, Hyatt Roller Bearings as Applied to Mine and Industrial Cars. 16 pp., 7x10 in.; illustrated.

The Goulds Manufacturing Co., Seneca Falls, N. Y. Bulletin 107, Deep-Well Triplex Pumps. 12 pp., 7¾x10 in., illustrated.

Bulletin No. 108, Deep-Well Working Heads. 12 pp., 7¾x10 in., illustrated.

Bulletin No. 109, Pumps for Special Services. 20 pp., 7¾x10 in., illustrated.